Heating Piping & Air Conditioning

FEBRUARY 1957

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INDUSTRIAL • COMMERCIAL • INSTITUTIONAL • PUBLIC BUILDINGS

Journal Section of the American Society of Heating and Air-Conditioning Engineers—p. 229

The stage is set in Chicago's vast International Amphitheatre for the 13th International Heating & Air-Conditioning Exposition—held in conjunction with the 63rd Annual Meeting of ASHAE. HPAC herein presents its SHOW SECTION, in which it has listed exhibitors and products on display, together with a handy guide to aid you in getting the most from the "biggest show yet!" . . . . page 195

THIRTEENTH
INTERNATIONAL HEATING &
AIR-CONDITIONING
EXPOSITION
INTERNATIONAL AMPHITHEATRE, CHICAGO
FEB. 25-MAR. 1, 1957

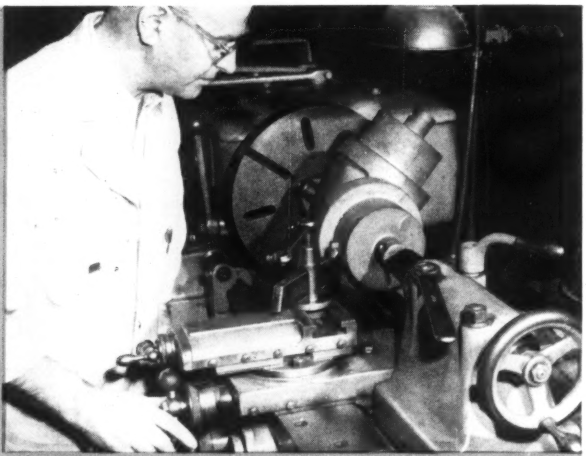
How GRINNELL insures the accuracy of its pipe fittings

The accuracy and uniformity that is built into Grinnell pipe fittings starts at the pattern shop. Here, pattern makers, highly skilled from many years of experience with Grinnell products, painstakingly machine the pattern models — the first step in producing a top quality fitting.

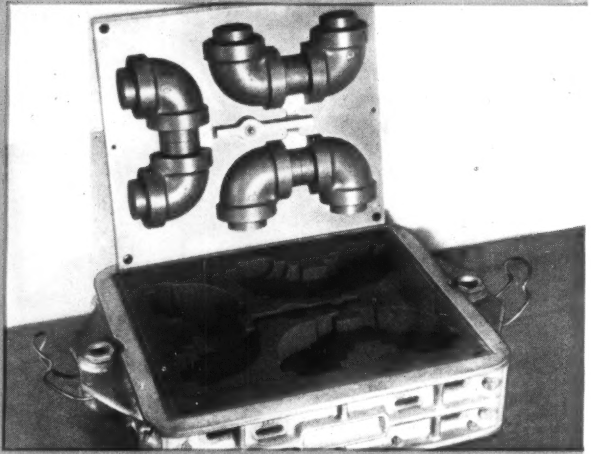
These craftsmen also make the precision core box to the same exacting tolerances as the pattern. Perfectly matched to each other, the core made from the core box and the mold made from the pattern produce the exceptionally accurate casting.

Special machines, designed and custom-built by Grinnell engineers and tool room experts, complete the machining of the Grinnell fitting.

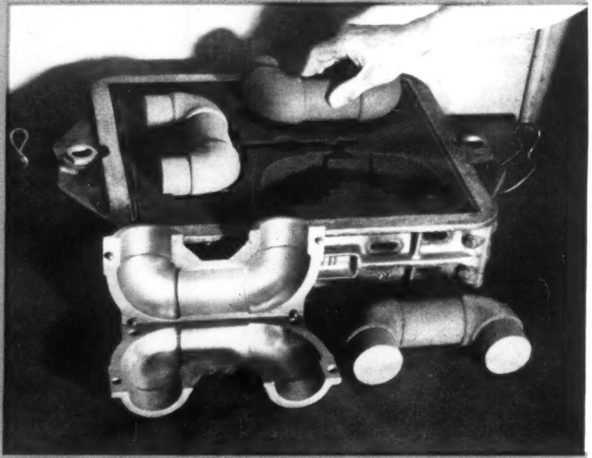
Other outstanding features of Grinnell fittings include: high quality metal; smooth surfaces inside and out; proper chamfer for easy starting and protection of first thread; precision threads for easy running up and tight joints; exact angles; and tested strength. Order a supply from your local Grinnell Distributor.



One of Grinnell's highly skilled pattern makers machines the model for a 90° elbow.



Shown here is a multiple mold for 90° elbows which has been made from the pattern above it.



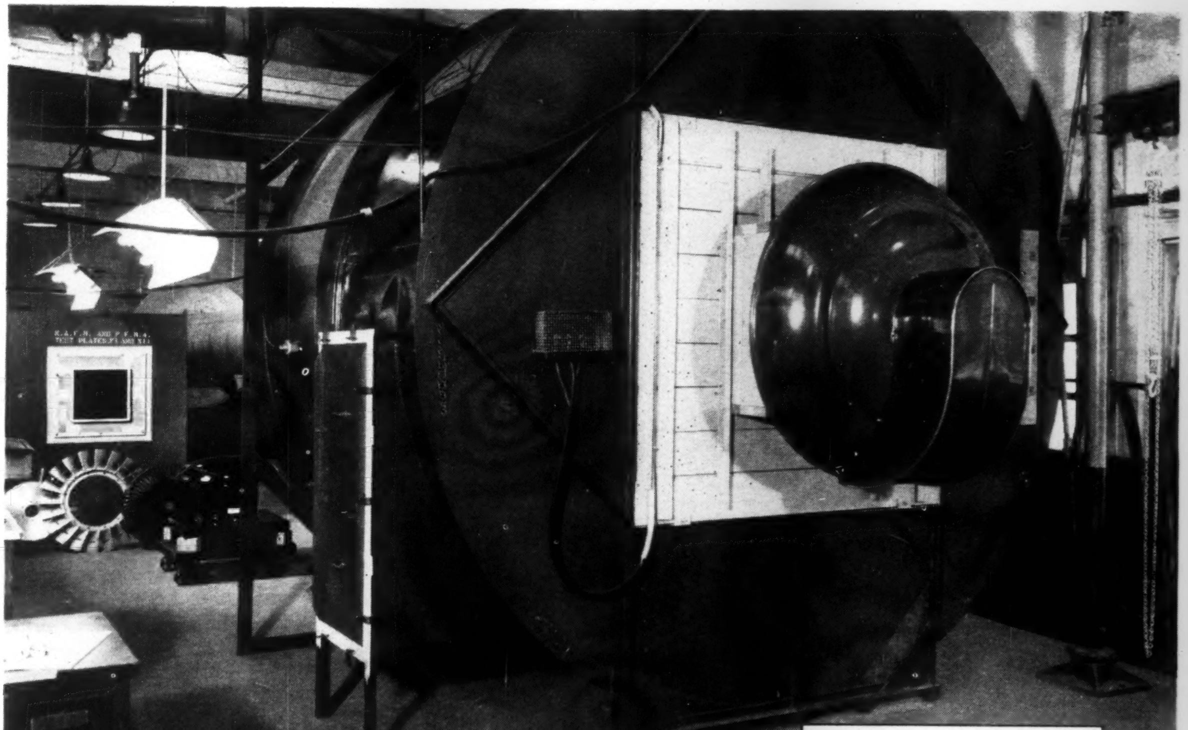
In the foreground is the precision core-box and core made in it. In the background, cores are being placed in the mold.

GRINNELL

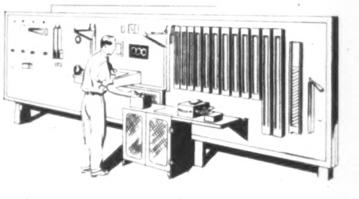
WHENEVER PIPING IS INVOLVED

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

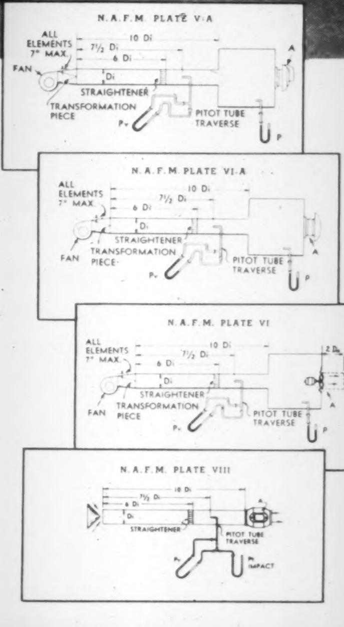
Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports
Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems



DeBothezat cfm ratings are CERTIFIED
. . . no guesswork when you select fans



Here's why you can select a DeBothezat fan by its exact catalog rating — without making any allowance "to be on the safe side." Thanks to DeBothezat's advanced testing facilities, all cfm ratings are *certified.* Right in the DeBothezat plant, accurate wind tunnel tests are made in accordance with the appropriate NAFM plate . . . and conform to U. S. Dept. of Commerce standard 178-51. So a DeBothezat rating is what the complete fan unit actually puts out. Send for Free 8-page bulletin entitled: "Certified Air Moving Equipment." Address Department HP-257.



N.A.F.M. PLATE V-A
ALL ELEMENTS 7° MAX.
10 Di
7½ Di
6 Di
Di
FAN
STRAIGHTENER
TRANSFORMATION PIECE
PITOT TUBE TRAVERSE
Pv
P
A
N.A.F.M. PLATE VI-A
N.A.F.M. PLATE VI
2 Do
Do
N.A.F.M. PLATE VIII
IMPACT

De Bothezat FANS

A DIVISION OF
American Machine and Metals, Inc.
EAST MOLINE, ILLINOIS

To keep corrosion from "calling collect"—
Pacific Telephone & Telegraph Company used Wrought Iron Pipe

This radiant heating system, serving 22,500 square feet of floor area in Pacific Telephone & Telegraph Company's new warehouse at San Leandro, California, is an excellent example of the Company's insistence on durability. More than 16,300 feet of corrosion-resistant wrought iron pipe was used to safeguard the system against premature failure and costly repair.

The system, planned and designed by PT&T's Engineering Department, features some interesting construction details employed to protect the floor against damage from heavy fork-lift trucks and impact caused by bouncing reels of cable. After the 10-inch structural slab was poured, wrought iron pipe coils were laid in place. Over the pipe coils, a wire mesh was stretched to strengthen the concrete "topping" slab, and contribute to more even heat distribution. Then the pipe and mesh were covered with 3 inches of concrete. A metallic floor hardener was applied to the surface.

Architects for the project were Thomsen & Wilson, San Francisco. The system was designed by Harry S. Haley, San Francisco Consulting Engineer, in collaboration with Pacific Telephone & Telegraph Company engineers. The installation was made by Scott Co., Bay Area Mechanical Contractors.

Wrought iron pipe is ideally suited for this service because of its ease of installation, dependability in service. It takes short radius bends, without springback. It produces sound welds, free from pin-hole leaks. Its uniform structure assures sharp, full-depth threads. And because of its mechanical strength, wrought iron pipe withstands damage during installation. In service, wrought iron stays on the job longer, costs less per year.

Our bulletin, *Wrought Iron Pipe for Radiant Heating*, gives complete details, documents service records. Write for a copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. International Division: New York, N. Y.

Available throughout the world

BYERS *Wrought Iron Tubular and Hot Rolled Products*

ALSO ELECTRIC FURNACE QUALITY STEEL PRODUCTS

Heating Piping & Air Conditioning

Vol. 29 No. 2

(with which is merged the Aerologist)

DESIGN, INSTALLATION, OPERATION
AND MAINTENANCE IN
INDUSTRIAL, COMMERCIAL, INSTITUTIONAL
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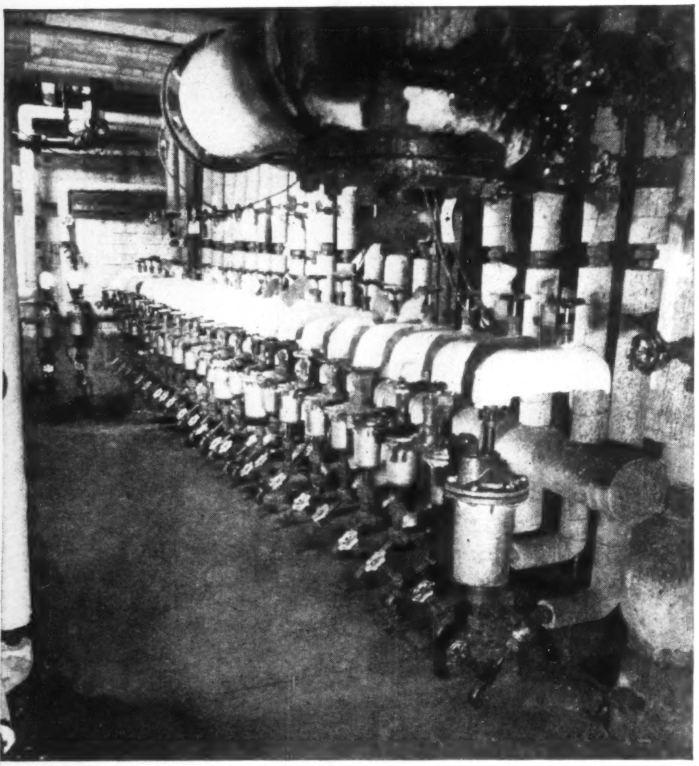
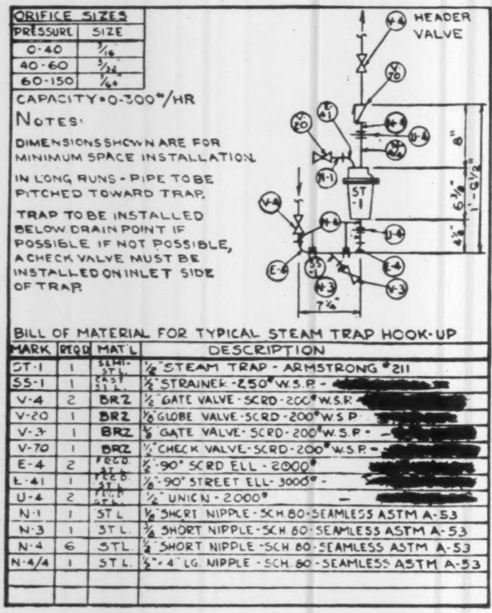
How Steam Trap Standardization *reduces Installation and Maintenance Work and Cost*



No Bypasses Needed. Traps can be replaced in a couple of minutes by uncoupling the unions and installing a "spare" trap complete with proper length pipe connections and half unions.



ORIFICE SIZES	
PRESSURE	SIZE
0-40	3/16
40-60	5/32
60-150	7/64

CAPACITY-0-300#/HR

NOTES:

DIMENSIONS SHOWN ARE FOR MINIMUM SPACE INSTALLATION.

IN LONG RUNS - PIPE TO BE PITCHED TOWARD TRAP.

TRAP TO BE INSTALLED BELOW DRAIN POINT IF POSSIBLE IF NOT POSSIBLE, A CHECK VALVE MUST BE INSTALLED ON INLET SIDE OF TRAP.

BILL OF MATERIAL FOR TYPICAL STEAM TRAP HOOK-UP

MARK	REQD	MAT'L	DESCRIPTION
ST-1	1	SEMI-STL.	1/2" STEAM TRAP - ARMSTRONG #211
SS-1	1	CAST STL.	1/2" STRAINER - 250# W.S.P. - [redacted]
V-4	2	BRZ	1/2" GATE VALVE - SCRD - 200# W.S.P. - [redacted]
V-20	1	BRZ	1/8" GLOBE VALVE - SCRD - 200# W.S.P. [redacted]
V-3	1	BRZ	3/8" GATE VALVE - SCRD - 200# W.S.P. - [redacted]
V-70	1	BRZ	1/2" CHECK VALVE - SCRD - 200# W.S.P. - [redacted]
E-4	2	FRGD. STL.	1/2" - 90° SCRD ELL - 2000# [redacted]
E-41	1	FRGD. STL.	1/8" - 90° STREET ELL - 3000# - [redacted]
U-4	2	FRGD. STL.	1/2" UNION - 2000# — [redacted]
N-1	1	STL	1/8" SHORT NIPPLE - SCH. 80 - SEAMLESS ASTM A-53
N-3	1	STL.	3/8" SHORT NIPPLE - SCH. 80 - SEAMLESS ASTM A-53
N-4	6	STL.	1/2" SHORT NIPPLE - SCH. 80 - SEAMLESS ASTM A-53
N-4/4	1	STL.	1/2" × 4" LG. NIPPLE - SCH. 80 - SEAMLESS ASTM A-53

Standardized hookup includes test valve for trap testing, strainer, blowdown valve for cleaning trap, shut-off valves and unions for quick replacement.

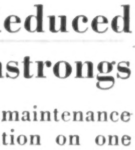
Trap Maintenance Costs Reduced $25,000 per Year with Armstrongs

Major reductions in steam trap installation and maintenance work and cost can be achieved by standardization on one make of trap which, in turn, permits standardized hookups. A major chemical company reports an annual maintenance saving of $25,000 since installing 4000 Armstrong traps according to the drawing and photograph shown here. Additionally, trap parts inventory is reduced and purchasing is simplified.

Traps of a Size Interchangeable. Note that exact dimensions are given for the pipe fittings, including nipples connected to each size of trap. When a trap needs repair, the unions can be uncoupled, the trap lifted from the line, and a "spare" carrying identical pipe connections slipped in place. In as little as one or two minutes, a faulty trap is replaced. It is then repaired and takes its place as a "spare".

$25,000 Trap Maintenance Saving. Records on the Armstrong trap installation described here show that the cost of repair parts was approximately $10,000 less annually than with the traps previously used. Reduction in maintenance labor brings the total saving to $25,000, per year. *And, fuel savings attributable to the traps are at least equal to the maintenance saving.*

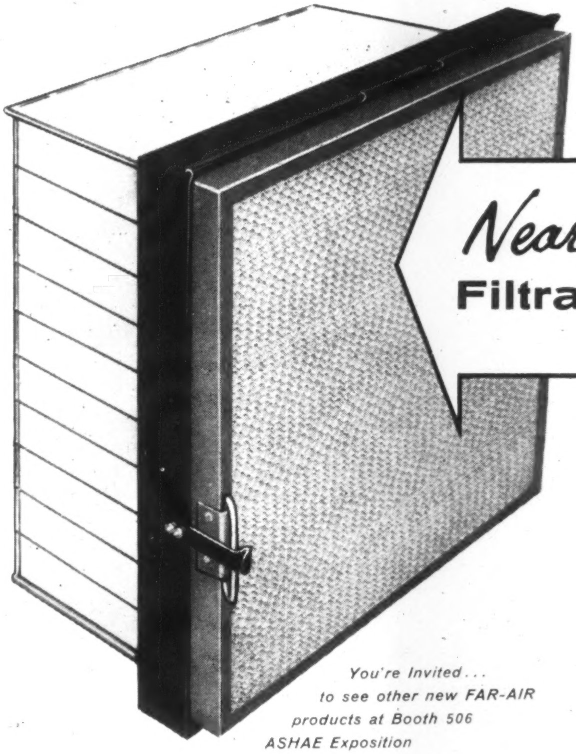
FOR COMPLETE INFORMATION on the traps that slash maintenance costs ask for the Armstrong Steam Trap Book containing complete data plus selection, installation and maintenance recommendations. Call your local Armstrong Representative or write.



ARMSTRONG MACHINE WORKS, 8742 Maple Street • Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

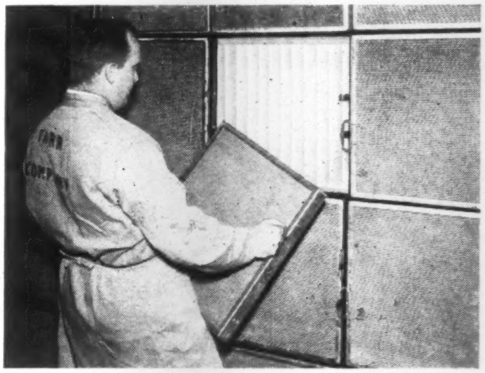
Nearly 100% Efficient Air Filtration at Lowest Cost!



You're Invited . . .
to see other new FAR-AIR
products at Booth 506
ASHAE Exposition

FAR-AIR TYPE HP
PAPER FILTER

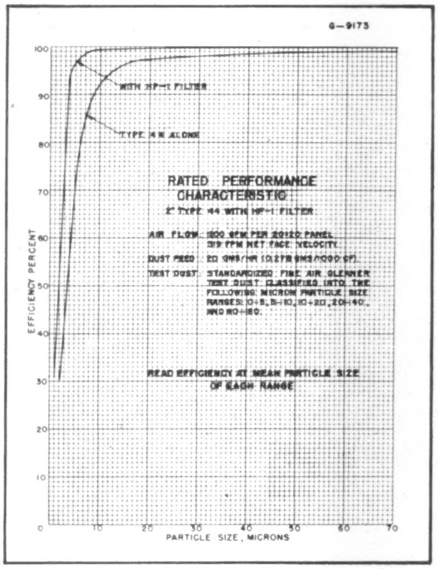
Here is an inexpensive paper after-filter that, when used in conjunction with your present permanent filters, gives air cleaning efficiency that rivals that of the most expensive equipment . . . *at only a fraction of the cost!* Perfected after years of research, this flame-proof filter with its specially crimped media is ideal for situations where airborne dirt is critical yet budget is a factor. When used in combination with the Far-Air panel filter, dust particles as low as 2 microns in size are effectively removed. In addition to lowest first cost, the HP has a longer service life and can be replaced for pennies.



Type HP in place behind a standard FAR-AIR filter.

The HP is provided with a zinc plated wire retainer that clamps easily on most present filter holding frames. It is quickly installed without special tools. The special, flame-proof paper media gives trouble-free service.

So, where super air cleaning is a necessity, the FAR-AIR Type HP offers an excellent solution. Write for complete technical data.



FAR-AIR HP AT A GLANCE

- *Installs without tools or special equipment*
- *Zinc plated wire frame*
- *9 to 1 filtration area to face area*
- *20 sq. ft. filtering area*
- *High velocity, minimum pressure drop*
- *Size: 20" x 20" x 8"*
- *Low replacement cost*
- *Flame proof*

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LOS ANGELES • NEW YORK • CHICAGO • NEW ORLEANS

Manufacturing Licensees:
Farr Company Mfg. Ltd.
Montreal, Canada
The Clyde Engineering Co. Pty. Ltd.
Sydney, Australia
Intermit Ltd.
Birmingham, England

Originators of **FAR-AIR** *Certified Filter Service*

Motels make B & G *Hydro-Flo* HOT

WITT'S END
HOT WATER HEAT · TELEVISION
MOTEL
NO VACANCY

South View
MOTEL
Sorry No
VACANCY
16 ROOMS
HOT WATER HEAT

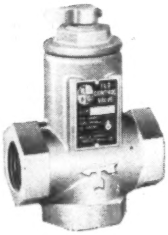
MERLENE
Motel
RADIANT HEAT
COM RATES
NO VACANCY

SUBURBAN
MOTEL
NO VACANCY
HOT WATER HEAT
AAA
T·V

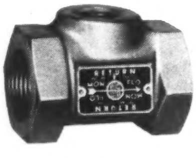
ONLY WATER OFFERS ALL 5

- Comfort heating
- Summer cooling
- Hot faucet water
- Zone control
- Snow melting

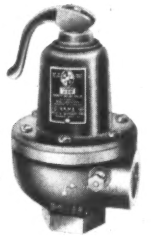
Everything for heating and



B&G Flo-Control Valve
Helps keep indoor temperature uniform.



B&G Monoflo Fitting
Permits use of single main—cuts piping cost.



B&G Relief Valve
Protects boiler against excessive pressure.

WATER HEATING the key to full occupancy

Alte Rest
MOTEL
HOT WATER HEAT
AAA

PLAZA
MOTEL
ULTRA MODERN
NO
VACANCY
TELEVISION
HOT WATER
HEAT
AAA

Motel owners everywhere are making a strong point of "Radiant Hot Water Heat" as the final luxury touch to today's fine motor court accommodations.

The same features which make forced hot water heating alluring to travelers can be applied as a distinguishing mark of genuine quality to any home!

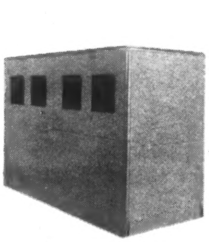
B&G *Hydro-Flo* Forced Hot Water Heating offers all the superior comfort advantages of *radiant* heat. Sunny warmth so smoothly controlled that every change in the weather is met with a corresponding change in the heat supply. No over heating—no under heating—no drafts—no fuel waste! And a year 'round supply of hot faucet water—always plenty for automatic washing appliances.

Now add these *plus values*, which can be included when building or at any time thereafter... zoning for different temperatures in different parts of the house... snow melting... and summer cooling in a manner which makes no compromise with the best in heating.

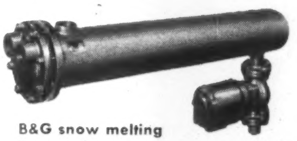
Builders of homes in every price bracket are capitalizing on the distinction offered by the B&G *Hydro-Flo* System. Write for the new 4-color booklet which shows why "Only Water Offers All Five."

B&G BOOSTER
The B&G Booster Pump is the key unit in a B&G *Hydro-Flo* System. Quiet, dependable, long-lived... over 2,000,000 have been installed to date.

cooling with water



B&G Package Water Chiller
for summer cooling systems.



B&G snow melting heat exchanger
Connects to same boiler that heats the house.

*Reg. U. S. Pat. Off.

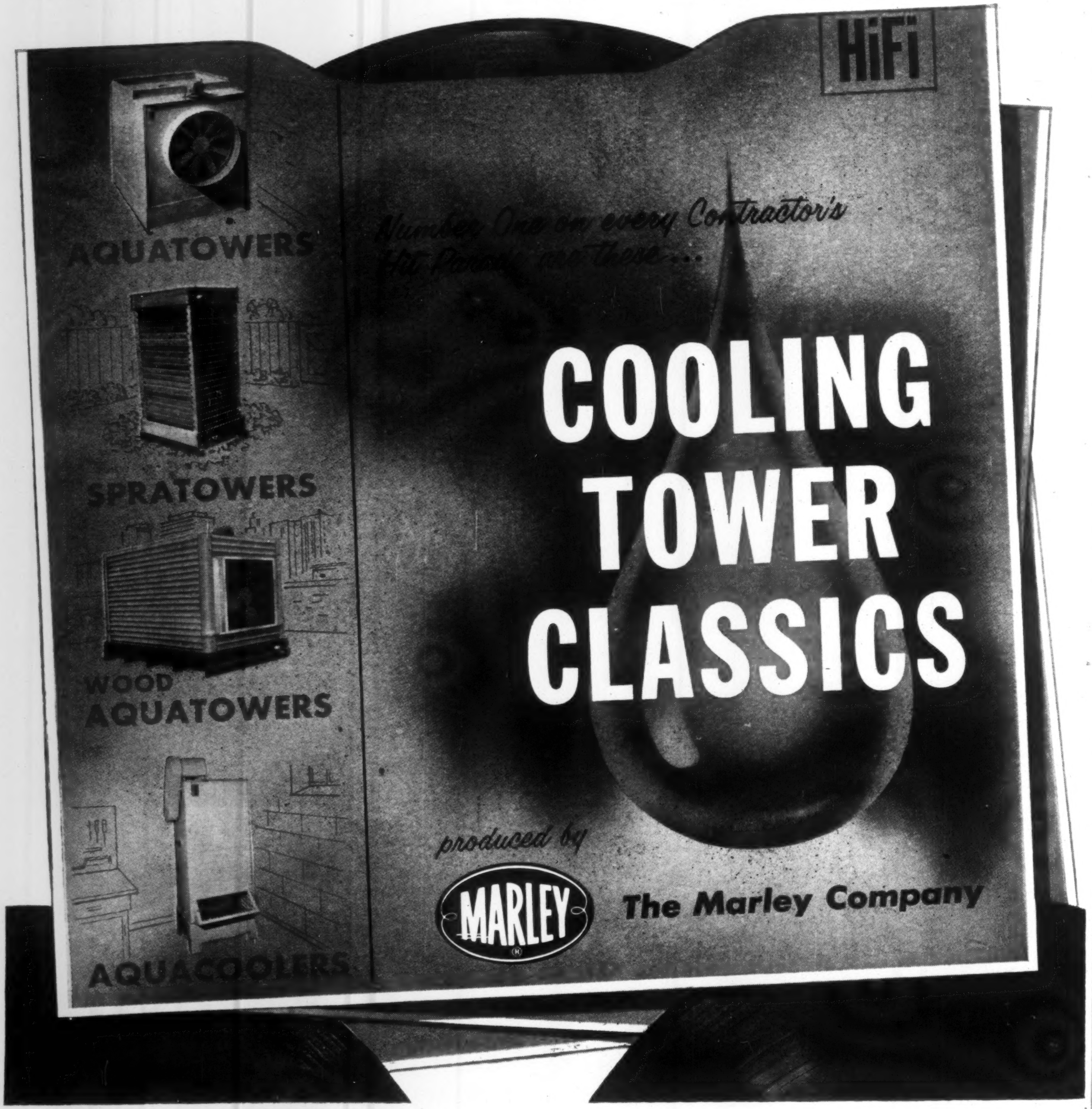
BELL & GOSSETT
COMPANY
Dept. ER-5, Morton Grove, Illinois
Canadian Licensee: S. A. Armstrong Ltd., 1400 O'Connor Drive, Toronto, Canada

Marley '57 Cooling

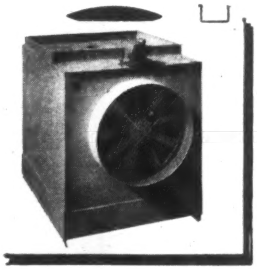
Marley water cooling towers have an unprecedented record of high-fidelity service. It's a record built by countless thousands of installations and 35 years of engineering leadership. It's a record certified by contractors and owners for lowest final cost based on investment, long service life and low service cost. And behind the record is Marley's willingness to back every product throughout those 35 years.

Small wonder that year after year far more contractors purchase Marley cooling towers for air conditioning and refrigeration than towers of any other make. This year's Marley line is more complete than ever before — and as always, the accent is on reliability, and highest product fidelity in every respect.

LOOK AT THIS RECORD . . . look at it carefully . . . and you, too, will buy Marley . . . and add to your own record for customer satisfaction.

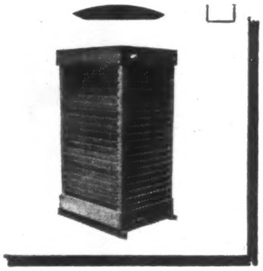

HiFi
AQUATOWERS
SPRATOWERS
WOOD AQUATOWERS
AQUACOOLERS
Number One on every Contractor's Hit Parade are these....
COOLING TOWER CLASSICS
produced by
MARLEY
The Marley Company

Towers are "Hi-Fi"



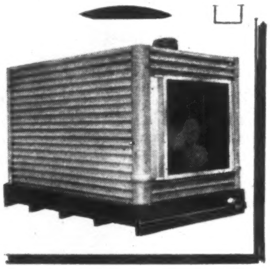
AQUATOWERS®

Long recognized as the pace setter in the packaged cooling tower field, Aquatowers are the overwhelming first choice of architects, engineers, contractors and users. Available in a complete range of sizes (12 models) rated from two tons nominal up, they are guaranteed to deliver economical, positive cooling with a minimum of maintenance. Casings are of heavy gauge steel with MarClad finish that guards against corrosion, abrasion and moisture penetration.



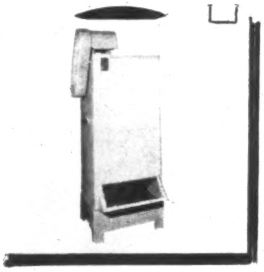
SPRATOWERS®

Marley produces a complete line of natural draft SpraTowers ideally suited for air conditioning and refrigeration application where lowest cost per gallon of water circulated is a requirement. They are prefabricated and piece-marked for easy installation. Marley's super-spray system achieves greater water break-up and longer air-water contact. Available in all air conditioning and refrigeration sizes.



WOOD AQUATOWERS®

Incorporating many of the features of the popular steel Aquatowers, Marley's line of wood Aquatowers is especially applicable in areas with highly corrosive atmosphere. Larger models ship disassembled, are easily hoisted and erected. Wood Aquatowers are available in five models.



AQUACOOLERS®

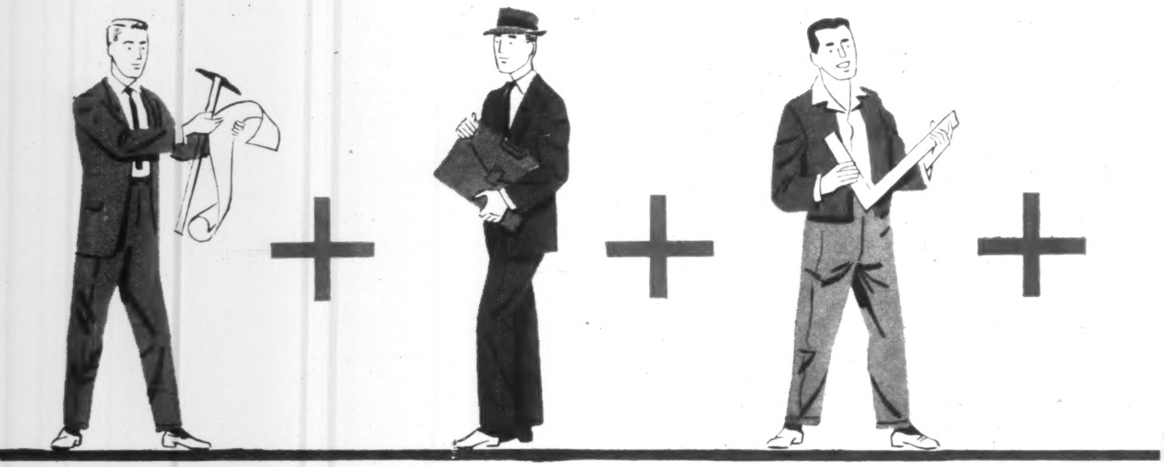
Designed for indoor or outdoor installation, this complete line of Marley towers is available in a wide range of sizes from three tons up. Highlight features are the centrifugal blower that assures whisper-quiet operation, non-clog nozzle water distribution and ample nailless wood filling for maximum water break-up and longer air-water contact. AquaCooler discharge air may be simply and successfully vented to exterior.

Call your Marley distributor for information
and prompt delivery of these "hi-fi" performers!

The Marley Company

Kansas City, Missouri

A WINNING COMBINATION • •



THE ARCHITECT
can specify the National-U.S. heating-cooling system to fit his requirements exactly from the most modern and complete line available in the industry—for residential, commercial, institutional and industrial applications.

THE ENGINEER
can place his confidence in National-U.S. Radiator's reputation. He will be sure of top product performance, quality material and high grade workmanship backed by over 60 years experience in the design and manufacture.

THE CONTRACTOR
can look to National-U.S. to provide products that are easy and inexpensive to install as well as complete application data, specifications and technical assistance. Too, nation-wide distribution assures quick delivery, anywhere.

THE WELCOME MAT IS OUT!

BOOTHS 802-803-811

13th International Heating and Air Conditioning Exposition

FEBRUARY 25—MARCH 1, Chicago

Member: Better Heating-Cooling Council

• • FOR SATISFACTION AND PROFIT!

THE OWNER
can be sure of enjoying, in complete comfort, the clean, healthful heating and cooling afforded with National-U.S. Radiator products. Precise control, economical operation and years of dependable, trouble-free service are his too.

NATIONAL-U.S. RADIATOR CORPORATION

•

One source . . .
One responsibility for all

HEATING and COOLING

Serving the team that specifies, engineers, installs and uses systems for heating and cooling with water is the job of National-U.S. Radiator Corporation. Its research men and designers work in close cooperation with this team "in the field" to engineer and make the most complete and efficient line of heating and cooling equipment available today. Whatever the need, whatever the fuel, whatever the climate —National-U.S. can fill all heating and cooling requirements.

National-U.S. Radiator
CORPORATION

HEATING AND AIR CONDITIONING DIVISION
Johnstown, Pennsylvania

Only water carries Heat or Cold . . . so far . . . so well!

How *high velocity* solves problem of *flexibility* in the Medical Towers

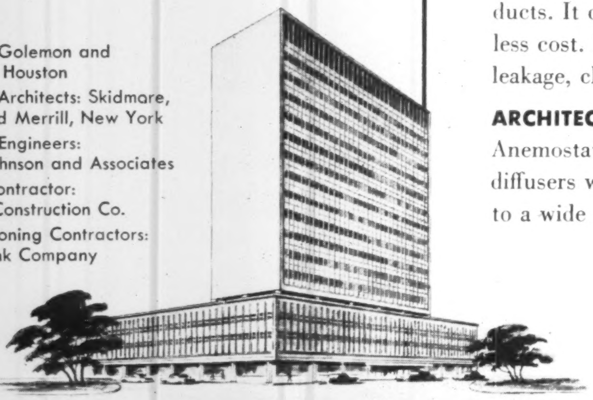
Architects: Golemon and Rolfe, AIA, Houston

Consulting Architects: Skidmore, Owings and Merrill, New York

Consulting Engineers: Bernard Johnson and Associates

General Contractor: Tellepsen Construction Co.

Air Conditioning Contractors: Straus-Frank Company



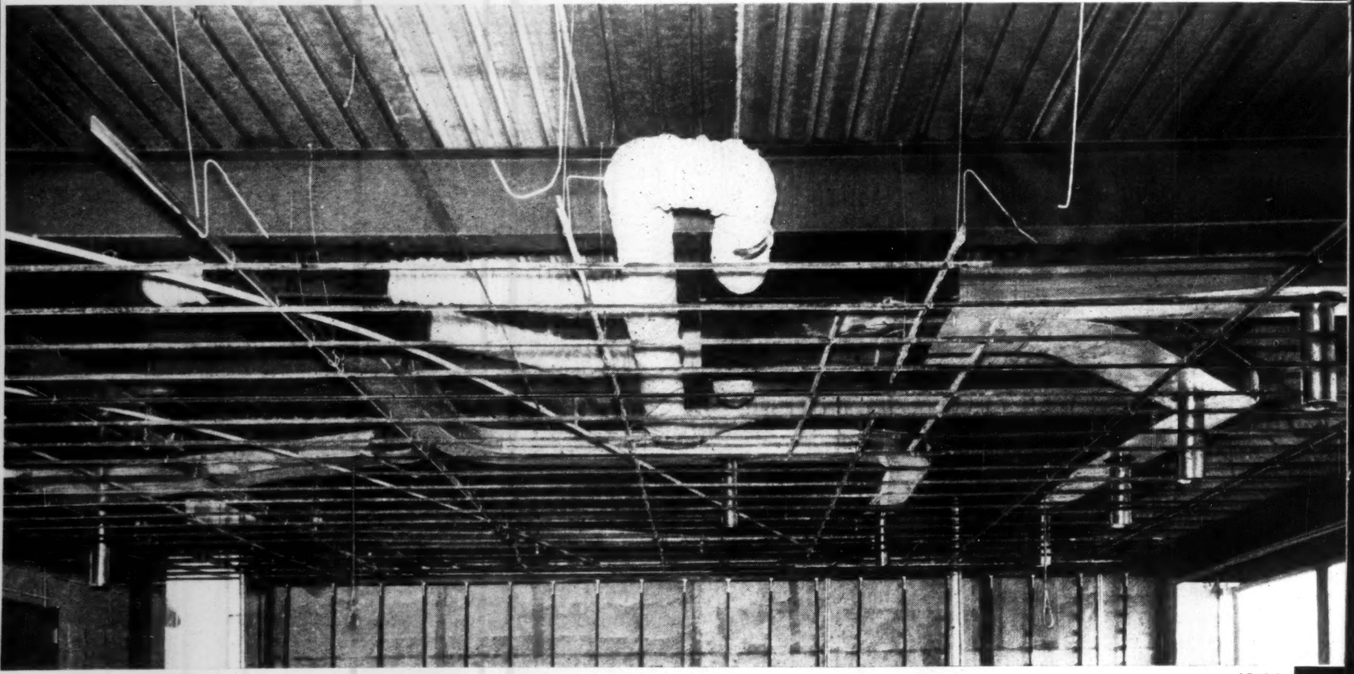
When the new Medical Towers Building in Houston, Texas was planned, the key air conditioning problem was flexibility. Professional office areas had to be subdivided *after* the building was completed. Here's how an Anemostat dual duct high velocity air distribution system solved the problem.

As shown in the diagrammatic sketch, a system of perimeter take-offs from the hot and cold ducts enables each doctor to provide the exact temperature he wants. Temperatures in the various rooms of each suite of offices can be varied. Air distribution is draftless, comfortable, perfectly suited to tenants' needs.

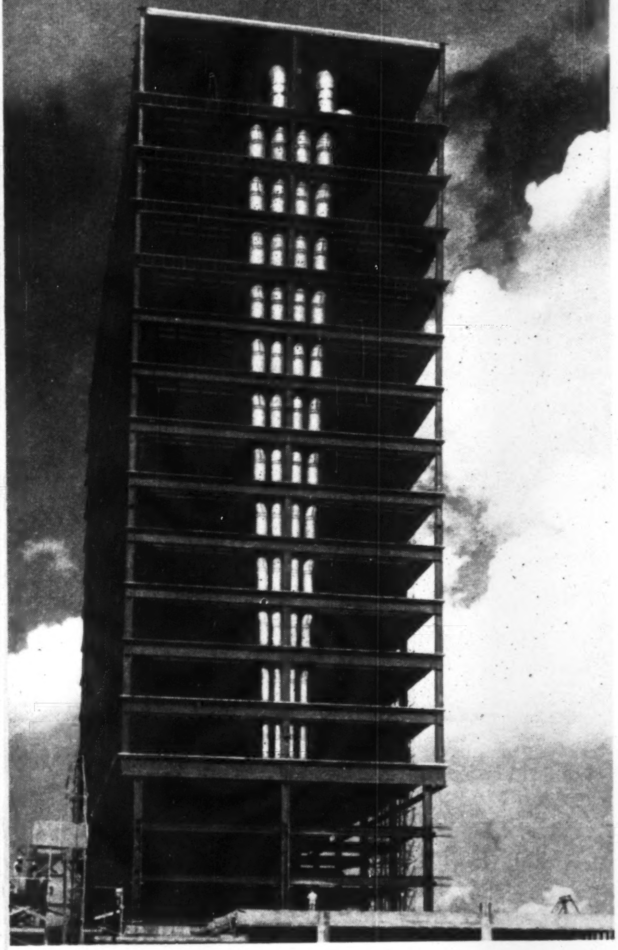
The Anemostat All-Air High Velocity distribution system offers further important advantages. It can be used with smaller than conventional ducts. It can be installed in less time and at less cost. It requires no coils, thus eliminates leakage, clogging and odors.

ARCHITECTS — Attention Please:
Anemostat round, square and straightline diffusers with high velocity units are adaptable to a wide variety of architectural designs.

Anemostat HPE units and duct connections installed in office before construction of ceiling and walls



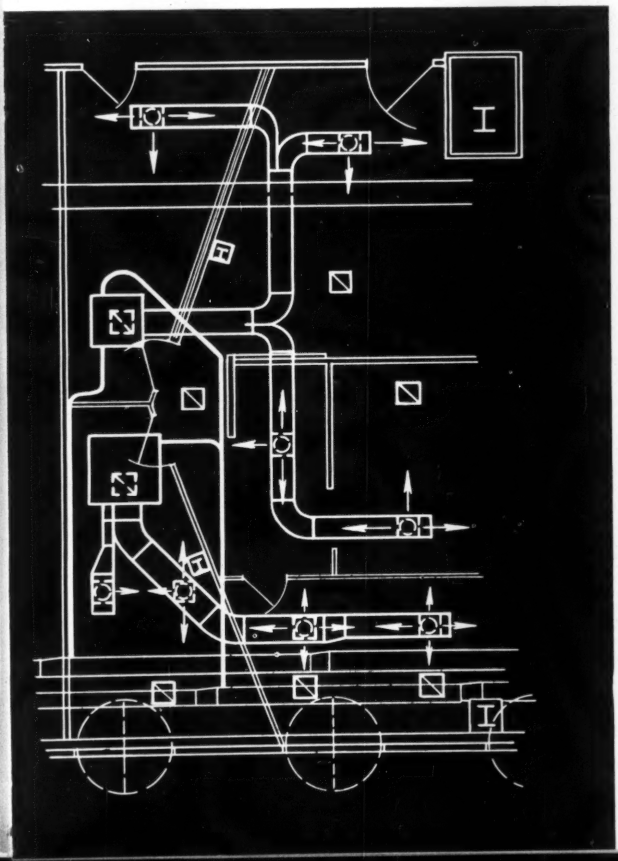
AC 1345



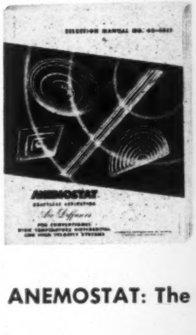
Note how locating of hot and cold ducts saves space in new Medical Towers Building, Houston, Texas

View of lobby showing Anemostat Air Diffusers

View of professional reception room



Layout of typical suite



Write on your business letterhead for your copy of

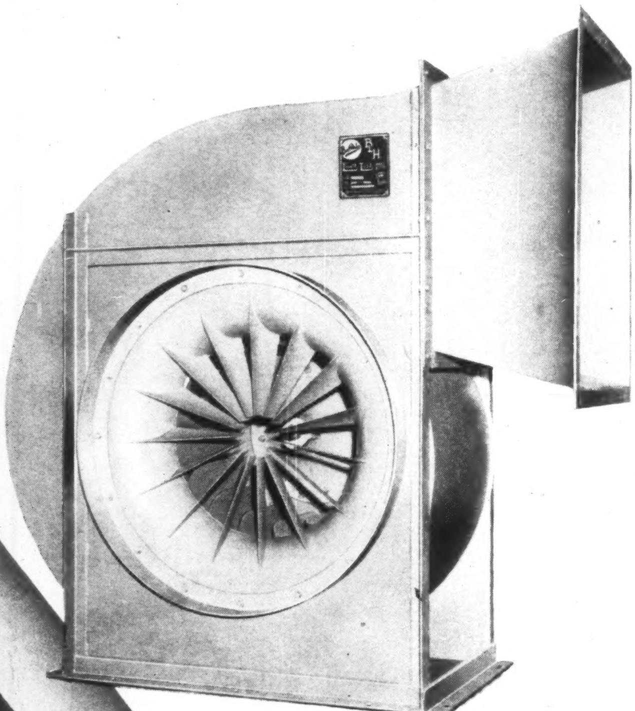
New Anemostat Selection Manual 60

to Anemostat Corporation of America,
10 East 39 Street, New York 16, N. Y.

ANEMOSTAT: The pioneer of All-Air High Velocity Systems

SPACE 937 • BUFFALO FORGE COMPANY

13th International Heating and Air Conditioning Exposition February 25 to March 1, 1957.



VISIT "Buffalo"

FOR THE

The past year has seen the culmination of many extensive research projects in air handling at "Buffalo" — Package Roof Ventilators — new high efficiency centrifugal fans — widened applications for improved "Buffalo" Package Propeller Fans — many new developments we feel will be useful and interesting to you.

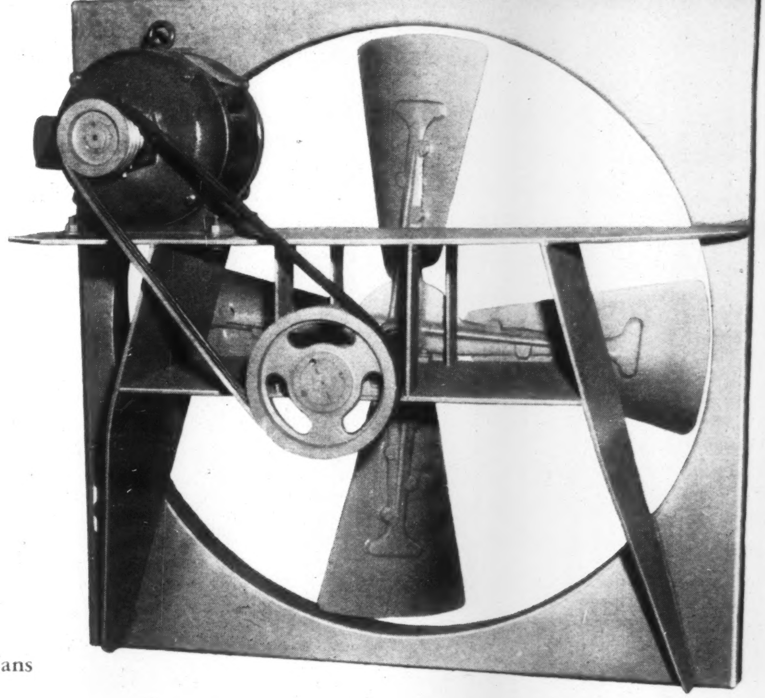
BUFFALO FORGE COMPANY

BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING   AIR CLEANING   AIR TEMPERING   INDUCED DRAFT   EXHAUSTING   FORCED DRA

NEW! A Class II, III and IV fan series with 86% mechanical efficiency.



NEW! Efficient package propeller fans in sizes up to 120".

AIR NEWS OF THE SHOW! "Buffalo"

"Buffalo" Engineers will be on hand at Space 937 to welcome you and show you what's new — February 25 to March 1.

NEW! Power roof ventilators in ready-to-install packages!

COOLING HEATING PRESSURE BLOWING

RICH'S
Electro-PL

TENNESSEE
RICH'S DEPARTMENT STORE, Knoxville. AAF's Electro-PL—the only filter combining dry filtration with electronic action — does the air cleaning job here. Maintenance? Periodic replacement of inexpensive Airmat paper media. Architect: Stevens & Wilkerson; Engineer: Edward E. Ashley.

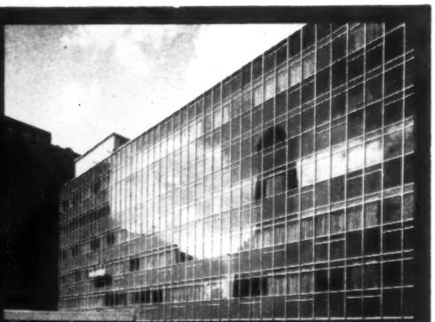
Clean Air by AAF.

PRUDENTIAL
irmat PL-24

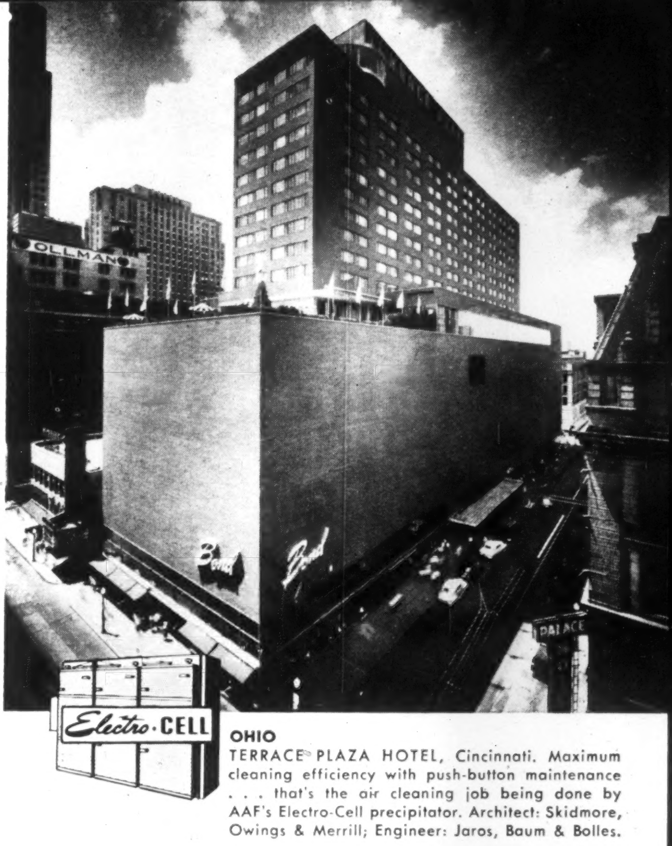
FLORIDA
PRUDENTIAL INSURANCE BUILDING, Jacksonville. AAF's Airmat PL-24 is on duty here. Periodic replacement of Airmat paper media takes care of maintenance duties. Architect: Kemp, Bunch & Jackson; Engineer: Edward Van Wagnen.

HOTEL STATLER
MULTI-DUTY

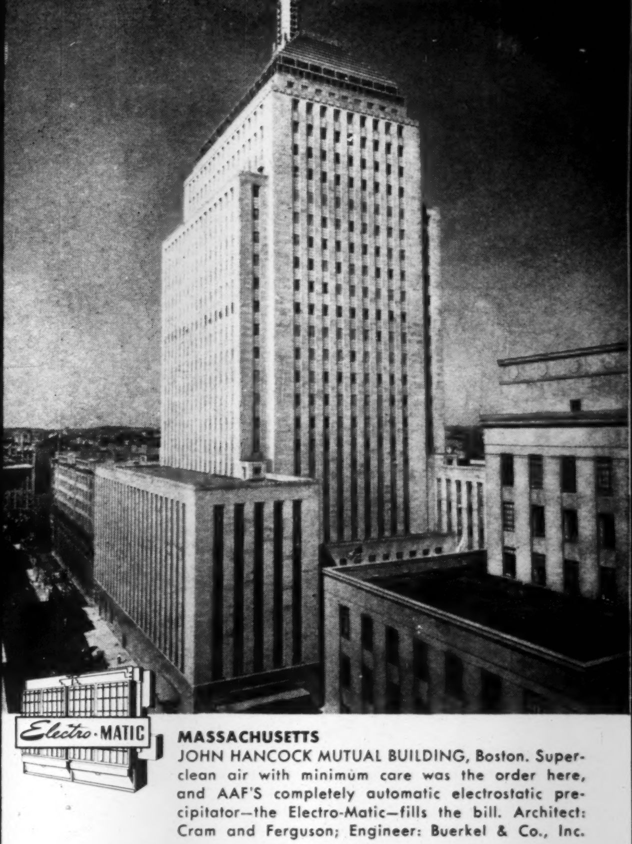
CALIFORNIA
HOTEL STATLER, Los Angeles. The self-cleaning Multi-Duty viscous filter is on the job here. Maintenance amounts to periodic removal of sludge. Architects, Engineers & Consultants: Holabird & Root & Burgee & Associates.



MINNESOTA
LUTHERAN BROTHERHOOD BUILDING, Minneapolis. Clean air here is by AAF's renewable-media Roll-O-Matic. Maintenance involves merely replacing dirt-laden media roll with a new one. Architect: Perkins & Will; Engineer: E. R. Gritschke.



OHIO
TERRACE PLAZA HOTEL, Cincinnati. Maximum cleaning efficiency with push-button maintenance . . . that's the air cleaning job being done by AAF's Electro-Cell precipitator. Architect: Skidmore, Owings & Merrill; Engineer: Jaros, Baum & Bolles.



MASSACHUSETTS
JOHN HANCOCK MUTUAL BUILDING, Boston. Super-clean air with minimum care was the order here, and AAF'S completely automatic electrostatic precipitator—the Electro-Matic—fills the bill. Architect: Cram and Ferguson; Engineer: Buerkel & Co., Inc.

. . COAST to COAST

The buildings pictured on these two pages are thousands of miles apart—both geographically and architecturally. They differ, too, in their selection of air filters. But they do have *this* in common: *all filters are AAF filters!*

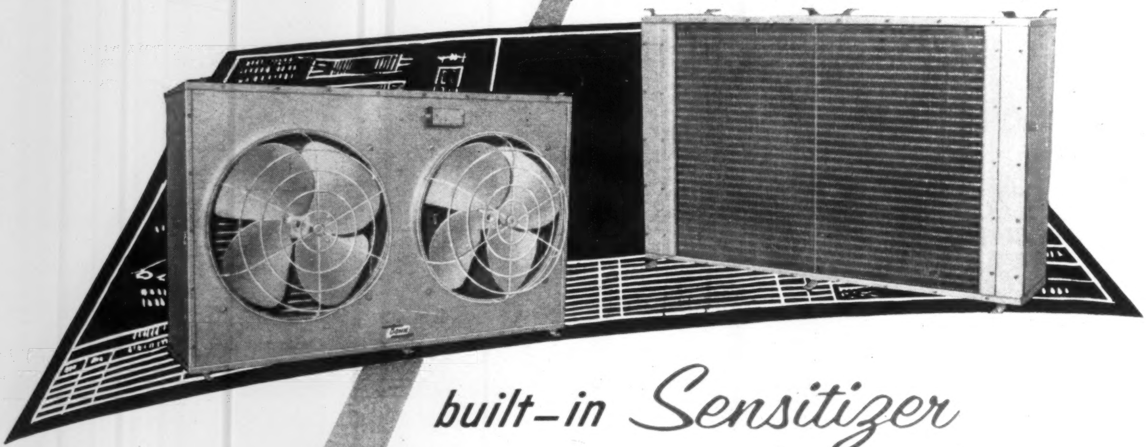
Instead of selling merely one or two kinds of filters, AAF sells *clean air,* and manufactures more than a dozen different types of filters to achieve it. From the complete AAF line, you can select the filter that gives you the *efficiency you need* plus the *maintenance characteristics you want!*

AAF—and *only* AAF—can recommend the one *right* filter for your specific requirements without compromise. Call your local AAF representative or write direct for further information.

AAF **American Air Filter**
COMPANY, INC.
herman nelson
373 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

VISIT AAF BOOTHS 38 and 40
International Heating and
Air Conditioning Exposition
February 25—March 1
International Amphitheatre, Chicago

BOHN Presents the NEW ANGLE in Air-Cooled Condensers



built-in Sensitizer maintains proper head pressures

Reduces Cost and Simplifies Installation

BOHN engineers have developed a winter controlled air-cooled condenser equipped with built-in sensitizer to maintain head pressures when outside air temperature drops . . . eliminate hand valves in the control system . . . simplify piping.

Cost of extra valve and installation expense is avoided. Further cost reduction is achieved by designing for simple multiple circuiting.

Of finest quality, new BOHN air-cooled condensers are economically priced. They offer sturdy, rust-resistant construction in grained aluminum cabinet housing . . . trustworthy capacity ratings . . . famous Betz coils . . . fans which operate quietly . . . life lubricated ball bearing motors with thermal overload protection.

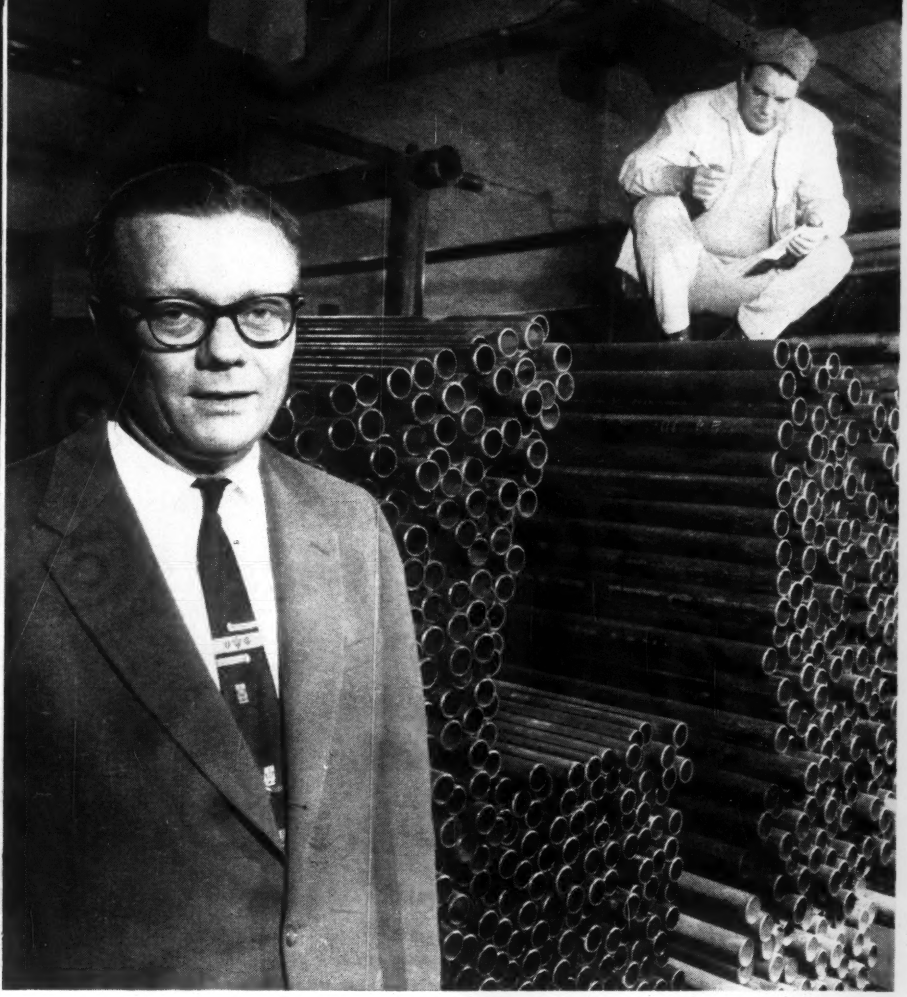
Read full details on the *NEW ANGLE* in air-cooled condensers. Reserve your free copy of the new BOHN CATALOG BU-1.

BETZ DIVISION
BOHN
DANVILLE, ILLINOIS

Manufacturers of Commercial Refrigeration. Industrial Air Conditioning and Special Heat Transfer Surface

BOHN ALUMINUM & BRASS CORPORATION • BETZ DIVISION • DANVILLE, ILLINOIS

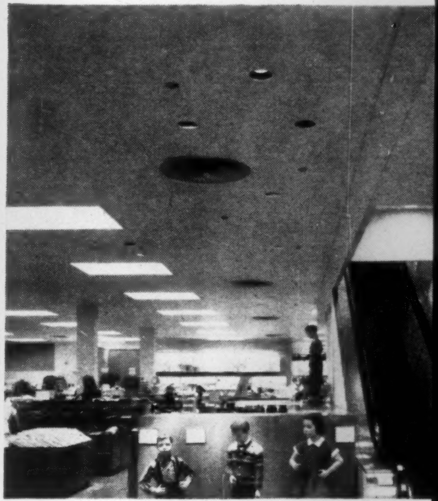
See Our Exhibit in Chicago at this Yeat's International Heating & Air Conditioning Exposition, Feb. 25-March 1.



Lee C. Oliver reports that Daniel J. Keating Company's Sprinkler Division has used SPANG Pipe exclusively for three years. Because Spang is so easy to work with, all jobs are ready-made at the shop, and assembled at job site.

LITS LITS
Lit Brothers

SPANG Pipe sprinkler system protects the Lit Brothers Camden Branch store and merchandise. System uses 30,000 ft. of pipe.



Low-hung ceiling panels hide sprinkler pipes; only the sprinkler heads show through. Total store area is approx. 150,000 sq. ft.

SPANG® CW pipe consistently delivers top-quality performance in sprinkler installations

says Mr. Lee C. Oliver, Manager, Sprinkler Division, Daniel J. Keating Company, Philadelphia

"We've been using SPANG CW Steel Pipe exclusively for three years," states Mr. Oliver. "Our experience has been that SPANG Pipe resists corrosion, vibration and the rough handling which every pipe undergoes during installation. It's easy to cut and thread, permitting us to prepare ready-made systems in the shop for assembly at job sites."

The SPANG sprinkler installation at Lit Brothers, Camden, N.J.

"We installed 30,000 ft. of SPANG Pipe at the new Camden (N.J.) Branch of Lit Brothers department store. The system set to go off at 165 F, is in operation at all times at pressures from 90 psi to 125 psi, and protects the building and merchandise.

"Upon completion of the installation, we tested the system at 200 psi for two hours, since any failure later on would be disastrous. But we have never run into a pipe failure on any SPANG Pipe installation."

SPANG delivers top-quality every time!

Quality Control makes the big difference. SPANG CW Steel Pipe is carefully controlled during manufacture, and is rigidly tested and inspected prior to delivery to assure you of a *top-quality* product for every type pipe installation.

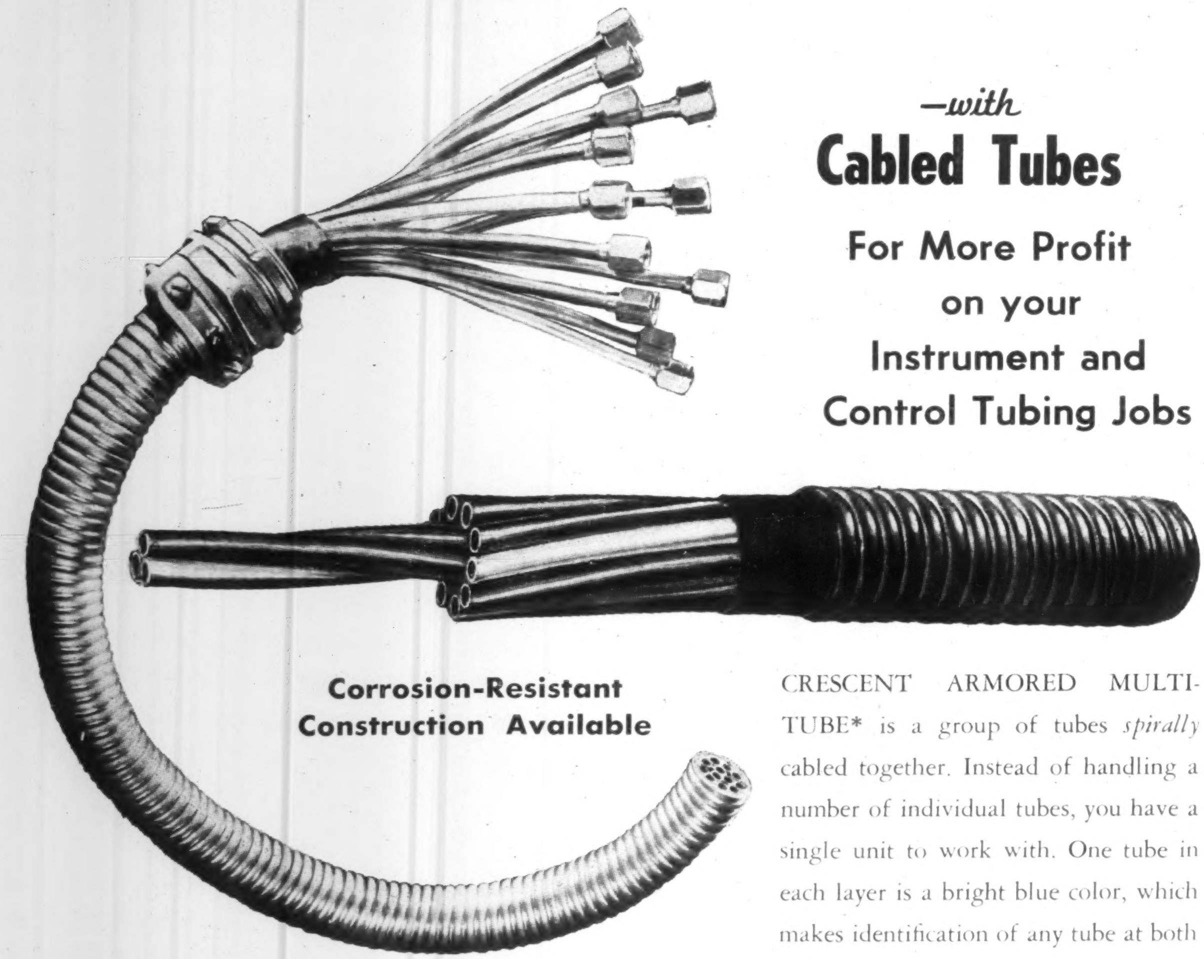
Try SPANG Pipe on your next job. You'll get *top-quality* service from your SPANG Distributor, too!

Architect: Thalheimer & Weitz, Philadelphia
General Contractors: Baton Construction Corp., Philadelphia
Spang Distributor: J. Levitt, Inc., Philadelphia

SPANG-CHALFANT
DIVISION OF THE NATIONAL SUPPLY COMPANY
General Sales Offices: Two Gateway Center, Pittsburgh, Pa. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis

SPANG CW® STEEL PIPE

CRESCENT ARMORED MULTITUBE*



—*with*

Cabled Tubes

For More Profit
on your
Instrument and
Control Tubing Jobs

Corrosion-Resistant
Construction Available

CRESCENT ARMORED MULTITUBE* is a group of tubes *spirally* cabled together. Instead of handling a number of individual tubes, you have a single unit to work with. One tube in each layer is a bright blue color, which makes identification of any tube at both ends an easy matter.

Users report *savings in installed cost* of from two to five times the cost of CRESCENT ARMORED MULTITUBE* as compared with the old method of using single tubes. Using the MULTITUBE* system will result in fewer connections and fittings, lower cost for supports or racks, ease of mounting and less space.

The spiral cabling of the tubes prevents distortion when the entire assembly is bent on a short radius. The tubing assembly is protected by a flexible, interlocked galvanized steel armor, or by a tough corrosion-resistant thermo-plastic sheath. This product is licensed under U. S. Patent 2,578,280.

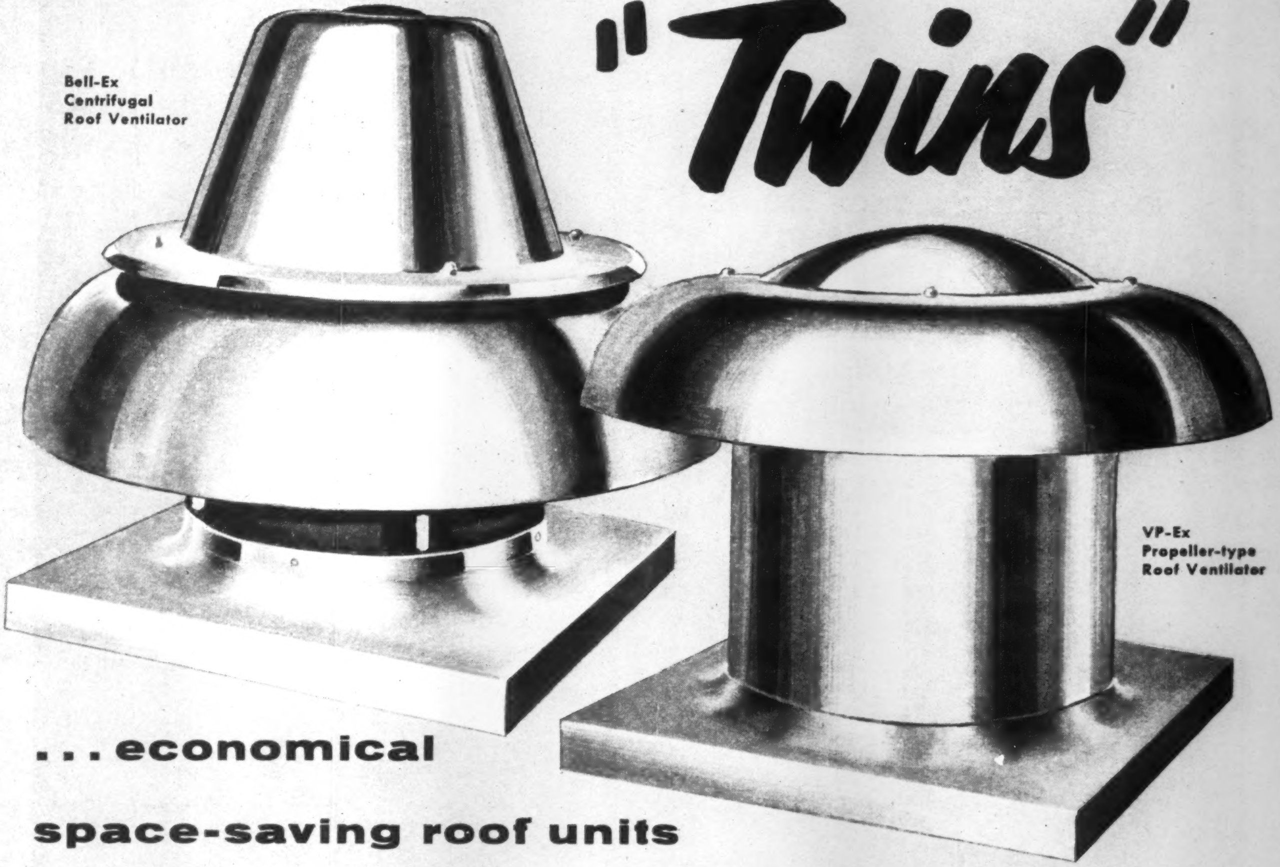
*Registered Trade Mark

Furnished in from 2 to 37 Tubes of Copper, Aluminum, Steel, Polyethylene
Also Special Construction for Underground Runs

SEND FOR TECHNICAL BULLETIN NO. 356-I GIVING COMPLETE INFORMATION

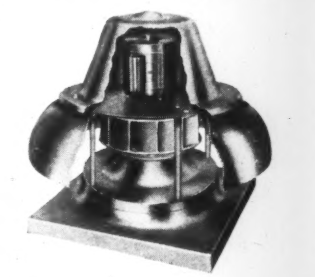
CRESCENT INSULATED WIRE & CABLE CO.
Trenton 5, New Jersey

Introducing ...the Roof Ventilator "Twins"

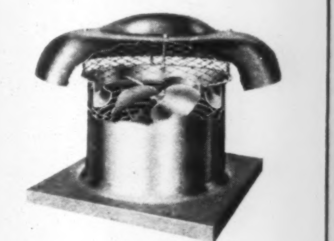


...economical space-saving roof units to simplify your ventilating problems...

When roof ventilators provide the answer to your ventilating needs, select one of the ***nyb*** "Twins" for maximum dependability . . . and *economy*, too! The Bell-Ex will exhaust against high resistances effectively from hoods and duct work; the VP-Ex is a sturdy, flexible unit that may be used where resistances do not exceed ¼ inch static pressure. The "Twins" are completely weatherproof and corrosion-resistant, easily accessible for maintenance . . . and of modern design to complement any exterior.



BELL-EX (B-12) cutaway view showing fan assembly; motor is fully enclosed, continuous duty type, ball bearing.



VP-EX cutaway view showing four-bladed fan, wire fan guard, spun inlet cone and bird screen.

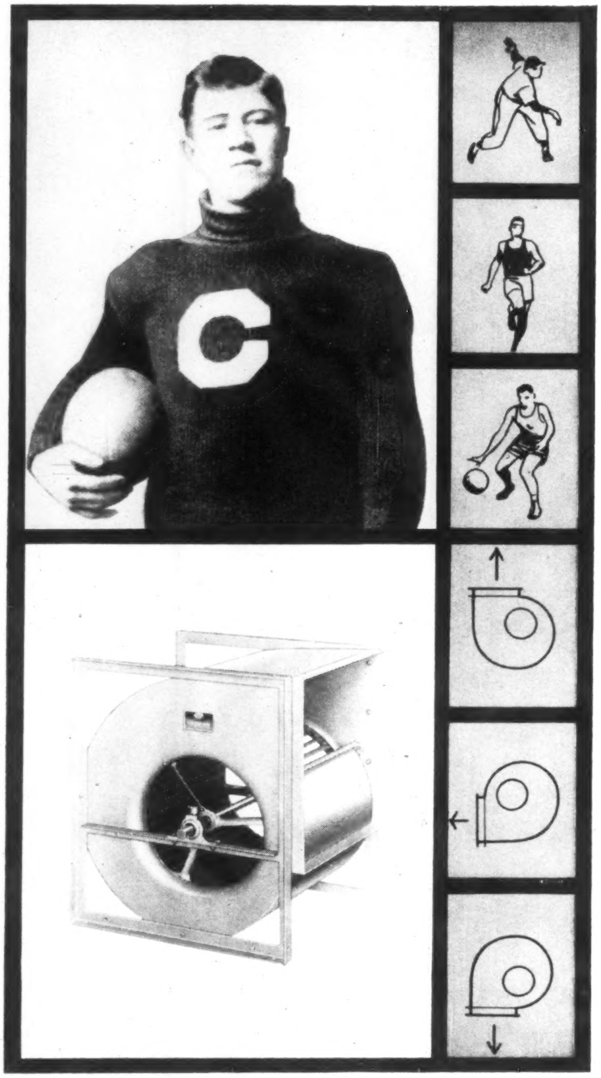
Write today for bulletins 565 and 566 for further details on the Bell-Ex and VP-Ex "Twins"

THE NEW YORK BLOWER COMPANY

SALES OFFICES: 3149 SOUTH SHIELDS AVENUE • CHICAGO 16

all-around MAN

all-around FAN



Remember the great Jim Thorpe? He could move from sport to sport . . . be a champion in **all** sports. Baseball, football, track, field—you name it—Jim could play it like the hero he was. Truly, he deserved the accolade "all-around man" of the sports world.

At Utility, we have an all-around blower as versatile as Mr. Thorpe in performing well at a number of jobs. A 4-Way Discharge Blower, it adjusts quickly to any of four positions—top horizontal, top vertical, bottom horizontal or bottom vertical. Actually, it's an **eight**-position fan, since it faces left or right at any of the above angles.

The rigid frame is the key to this blower's complete convertibility. You simply place the fan in the desired discharge position, and the job is done—without bolts or screws or costly sheet metal work. The rigid frame also adds a bonus of strength and stability to the installation. It's a boon from an inventory standpoint. Available in single and double widths, this blower takes care of many jobs without emergency re-ordering or cutting-to-fit on the job.

Of course, world-renowned Utility quality is built right in, with one-piece wheel for rigidity, long life and whisper-quiet operation. And because of Utility's years-ahead production techniques, this "all-around fan" is priced right down with the lowest. Proving again that when quality and price must get together, it makes sense to "get together" with Utility!

A Division of Utility Appliance Corp.

UTILITY FAN CORP.

911 East 59th Street, Los Angeles 1, California

UTILITY

Manufacturers of heavy
and standard duty blowers for
heating, air conditioning
and ventilating installations.
Producers of blowers
and blower parts for original
equipment manufacturers.
Write for catalogue data.

Titus
MFG. CORP.

You are cordially invited

...to come visit us and see our complete line of distinctive Air Conditioning Outlets

TITUS EXHIBIT

Booths No. 117 and 121

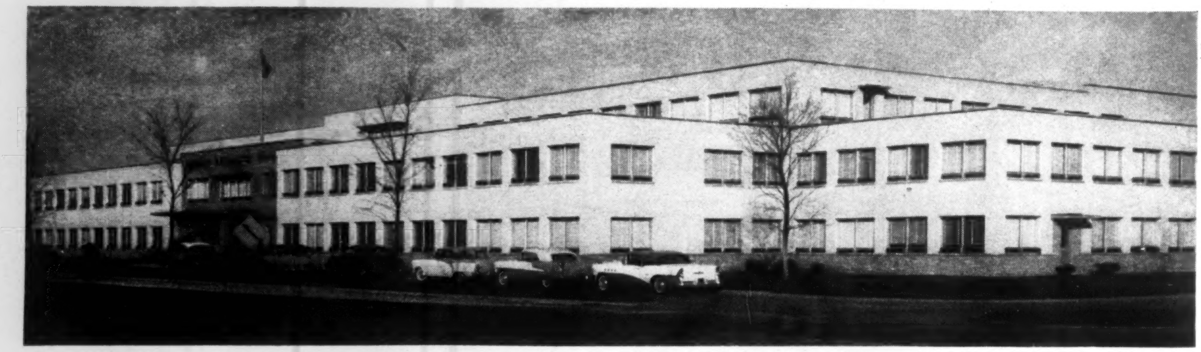
INTERNATIONAL HEATING & AIR CONDITIONING EXPOSITION

Feb. 25-Mar. 1, 1957

INTERNATIONAL AMPHITHEATRE, CHICAGO

TITUS MANUFACTURING CORPORATION • WATERLOO, IOWA

WAGNER ELECTRIC MOTORS...THE CHOICE OF LEADERS IN INDUSTRY



National Home Office of the Allstate Insurance Company.

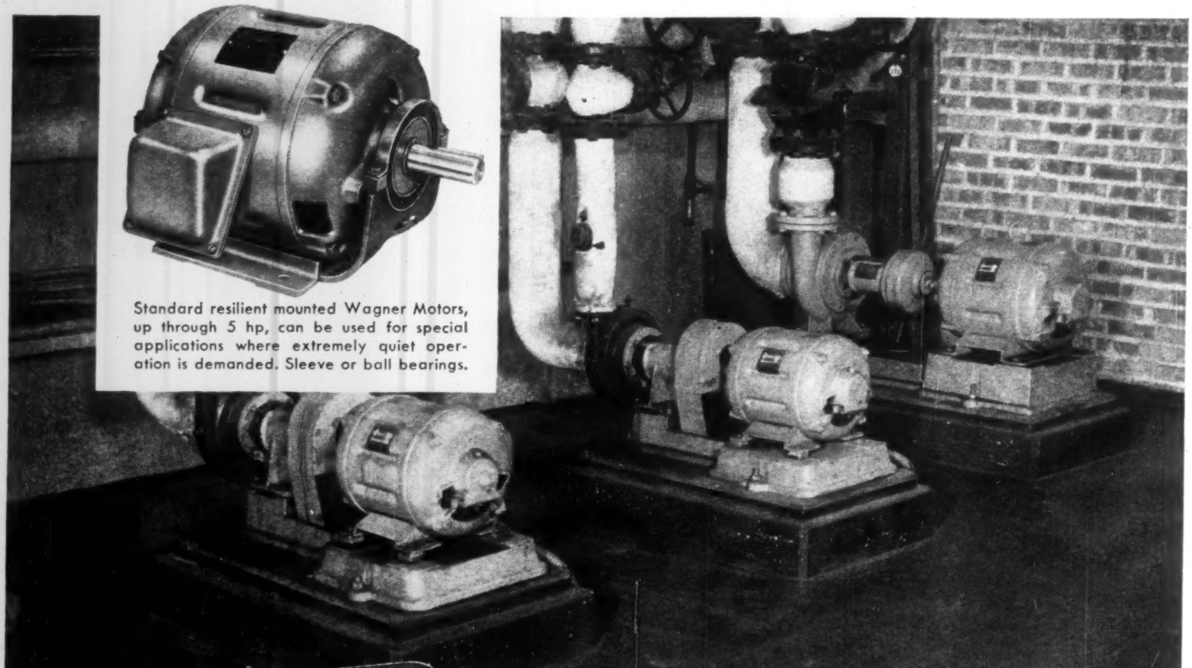
Wagner Motors help B & G Pumps meet their toughest test... QUIET OPERATION!

Circulating pumps used in hot water heating systems must be silent—vibrationless in operation, since they are the connecting links between the boiler room and the structure itself. A prime requirement for quiet pump operation is an electric motor that operates almost silently, yet has plenty of stamina to hold up under years of hard, steady operation.

That's why Bell & Gossett Company used Wagner Motors on the Universal Pumps in the Allstate Insurance Company home office. These quiet-type motors are known for smooth balance and quiet operation.

Perhaps you have a specialized motor application . . . if so, remember, there's a Wagner motor to fit every need . . . a complete line for all current specifications with a wide variety of enclosure types and mountings.

Your nearby Wagner engineer can help you select the *right* motor to meet your specifications. Call the nearest of our 32 branch offices or write us.



Standard resilient mounted Wagner Motors, up through 5 hp, can be used for special applications where extremely quiet operation is demanded. Sleeve or ball bearings.

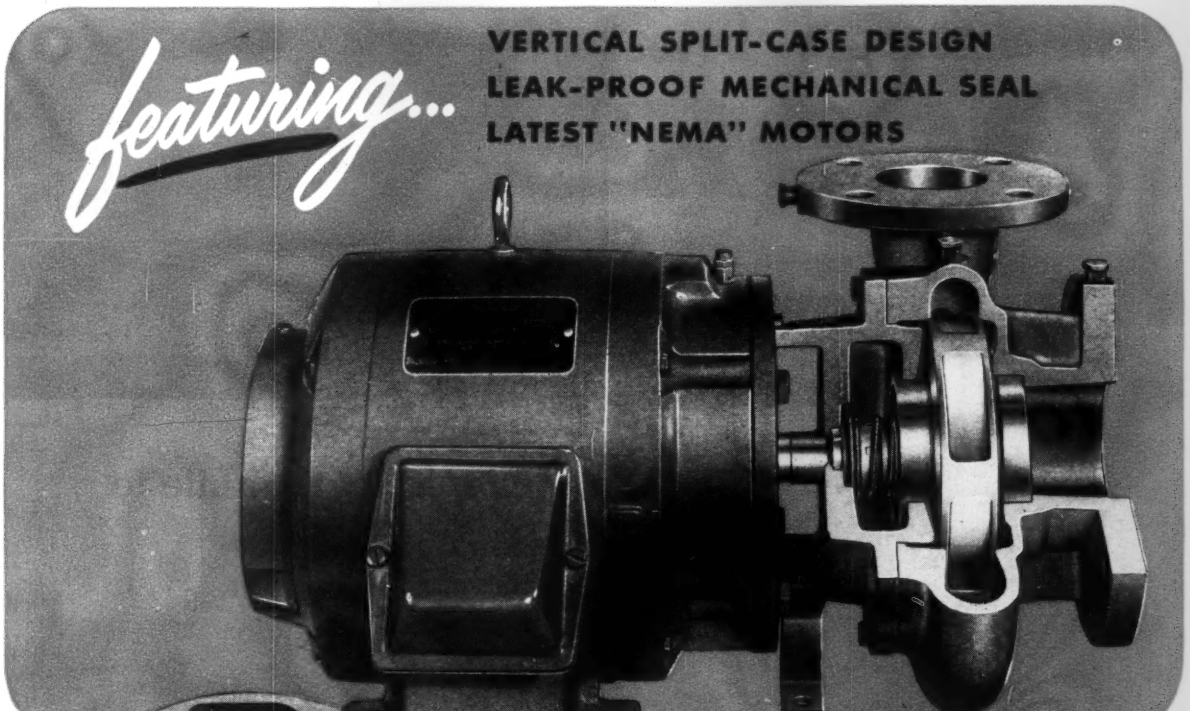
Wagner Electric Corporation
SERVING INDUSTRY SINCE 1891

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

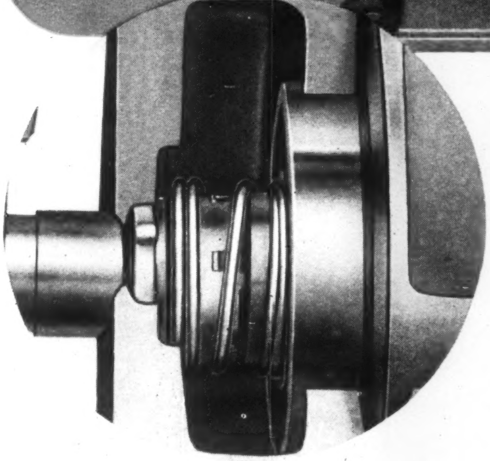
Wagner Electric Corporation
6370 Plymouth Ave., St. Louis 14, Mo., U. S. A.

M57-7

See the Wagner exhibit in Booth 1129 at the International Heating & Air Conditioning Exposition in Chicago



VERTICAL SPLIT-CASE DESIGN
LEAK-PROOF MECHANICAL SEAL
LATEST "NEMA" MOTORS



Leak-proof B & G "Remite" Mechanical Seal

FOR COOLING TOWER APPLICATIONS

B&G SERIES 1531 TYPE B

CENTRIFUGAL PUMPS

In the B&G 1531 Pump you'll find an impressive array of efficiency and performance features which will satisfy your most critical appraisal—

The Motor. Heavy duty with extra large shaft and over-sized bearings. Deep grooved radial thrust bearing counter-balances thrust load. Available *as open, splash-proof, totally enclosed or explosion-proof units.*

Motor Pump Bracket. Barrel type for maximum rigidity . . . counter-bored for perfect alignment. Support foot protects against vibration and strain.

Pump Shaft. High grade steel, super-finished for smooth, quiet operation and long life . . . oversized for minimum deflection. Gasketed sleeve protects against wear and corrosion.

B&G "Remite" Mechanical Seal. Eliminates leakage which occurs when a packing gland is used. A Carbon Seal Ring faces on a "Remite" floating seat—*a new material just a shade under a diamond in hardness*—gives trouble-free service when pumping liquid containing foreign material. The Seal is self-lubricating.

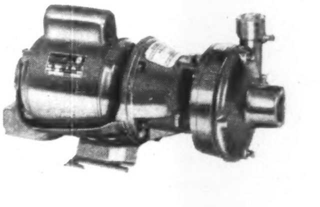
One piece volute and suction cover. Solid based with support foot. All the advantages of split-case design—no pipes to disconnect when servicing the pump. Rugged construction absorbs piping strains without transmitting stress to the motor shaft.

Impeller. Sound hydraulic design, mechanically balanced. Balance ring and relief holes reduce thrust. Precision fit on shaft assures easy removal and positive centering.

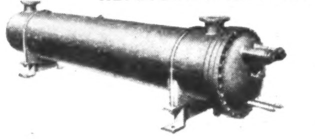
Capacities and materials. To 1100 GPM—420 ft. head. Available in all-bronze, all-iron and bronze-fitted units.

SERIES 1522 CENTRIFUGAL PUMPS

Really *quiet* . . . both pump and motor are equipped with *long bronze sleeve bearings!* "Remite" Mechanical Seal ends leakage troubles. Bearing bracket assembly is interchangeable. Capacities to 150 GPM—heads to 115 ft.



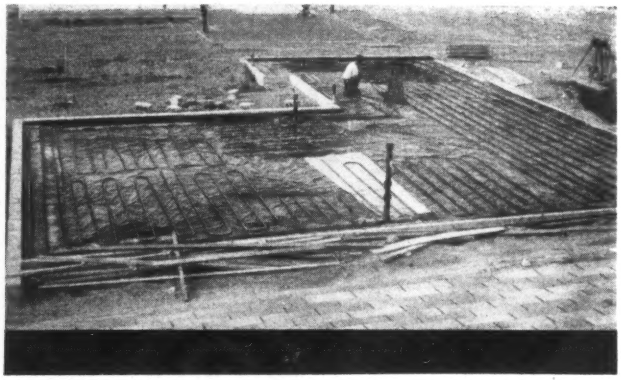
REFRIGERATION COMPONENTS



Complete line of Evaporators, Condensers, Heat Exchangers, Liquid Receivers and Package Liquid Coolers.

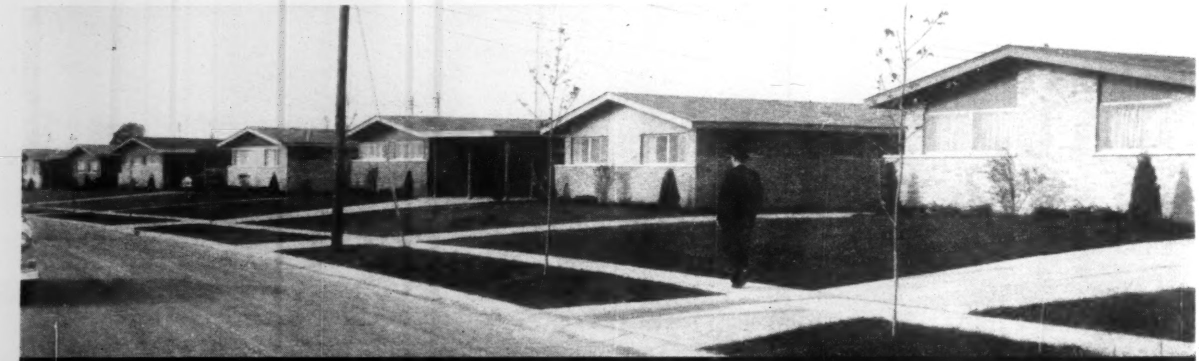
BELL & GOSSETT
COMPANY
Dept. RER-5, Morton Grove, Illinois

Canadian Licensee: S. A. Armstrong, Ltd., 1400 O'Connor Drive, W. Toronto, Canada



Youngstown steel pipe

. . . Gives Long, Maintenance-Free Life to Radiant Heating Installations



Youngstown Steel Pipe was installed by National Heating Co. in this 60-unit development of Modern Builders, Inc., both of Cincinnati, Ohio.

Specify Youngstown and secure these
7 Points of uniform goodness

uniform ductility
uniform lengths
uniform threading
uniform weldability
uniform wall thickness and size
uniform strength and toughness
uniform roundness and straightness

Modern residential developments—like this 60-unit project off Cincinnati's Winton Road—demand only the most modern heating facilities. So, to afford these new homeowners warm, draft-free rooms of equalized temperatures, invisible radiant heating systems utilizing Youngstown Steel Pipe were installed.

For years Youngstown Steel Pipe has been specified by leading architects as well as progressive plumbing and heating contractors for its dependability and long life. That's because it's made of only the finest steel by steelmen with over half-a-century of steelmaking knowhow. All Youngstown operations from ore mining to finish threading are closely quality-controlled to give you the best piece of pipe obtainable anywhere. Why not make Youngstown your specification for long, trouble-free installations?

For additional information or service, contact your local Youngstown distributor—or phone our nearest District Sales Office, today.

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Manufacturers of Carbon, Alloy and Yoloy Steel
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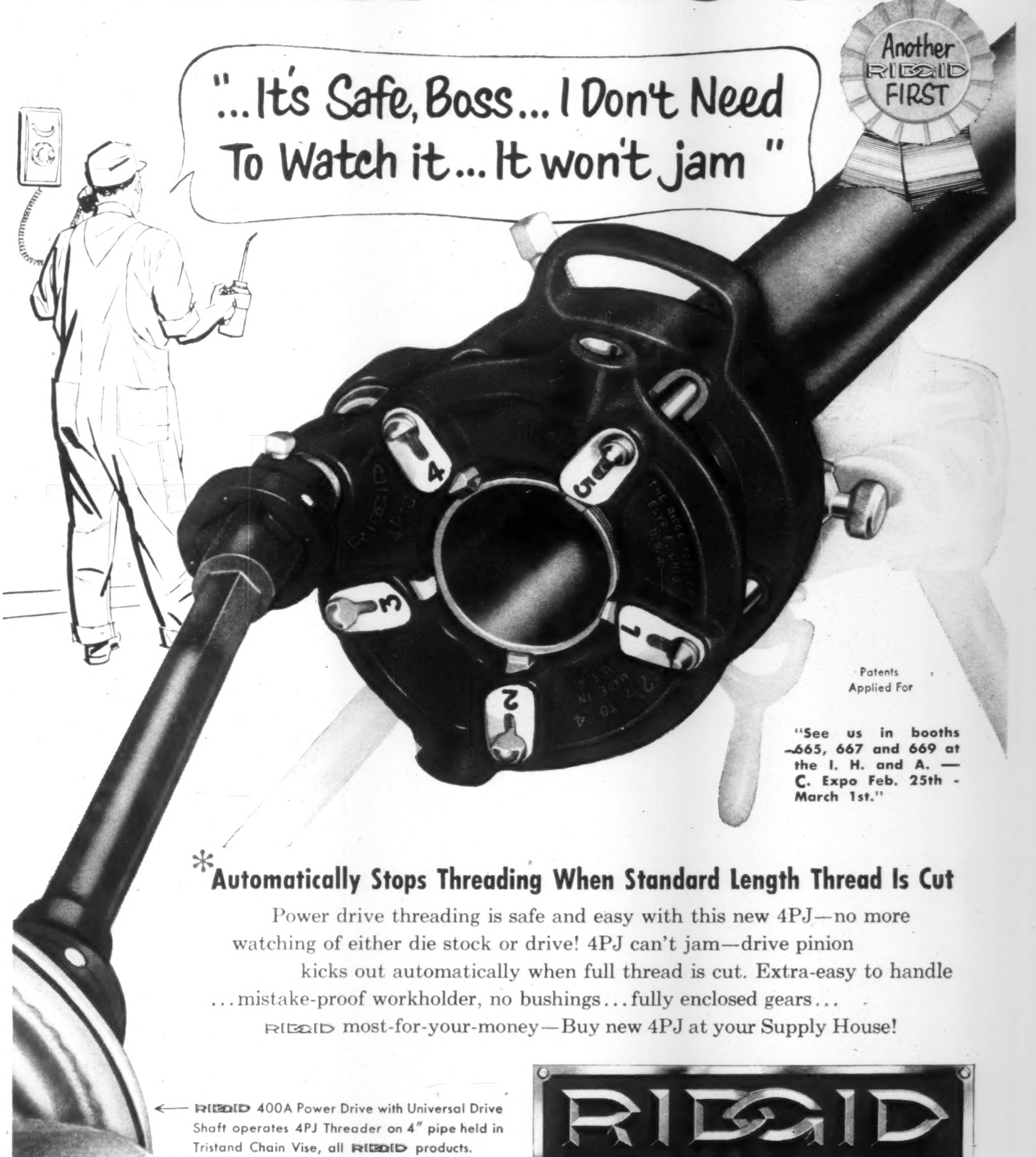
New RIDGID 4PJ Geared Threader Is Now

*JAM-PROOF


"... It's Safe, Boss ... I Don't Need To Watch it ... It won't jam"
Another RIDGID FIRST
RIDGID 4P-J
THE RIDGE TOOL CO. ELYRIA, OHIO U.S.A.
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5

Patents Applied For

"See us in booths 665, 667 and 669 at the I. H. and A. — C. Expo Feb. 25th - March 1st."

*Automatically Stops Threading When Standard Length Thread Is Cut

Power drive threading is safe and easy with this new 4PJ—no more watching of either die stock or drive! 4PJ can't jam—drive pinion kicks out automatically when full thread is cut. Extra-easy to handle ... mistake-proof workholder, no bushings ... fully enclosed gears ... RIDGID most-for-your-money—Buy new 4PJ at your Supply House!

← RIDGID 400A Power Drive with Universal Drive Shaft operates 4PJ Threader on 4″ pipe held in Tristand Chain Vise, all RIDGID products.

RIDGID
Work-Saver Pipe Tools

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NEW FASHION IN FANS: *IM-pak

*UTILITY'S *IM-pak SIMPLIFIES PRODUCTION CHANGES.* This new fashion in fans now eliminates top-heavy inventories of many unassembled parts, gives you an across-the-board stock of blowers that covers up to 98% of applications for residential air-moving equipment. Available in five sizes, you'll now be able to handle model changes *while in production.* Convertibility is the key: The two housing supports and motor mount bracket are not attached to the unit, but are included in the package with all hardware needed for rapid installation. Simply mount the motor and adjust the angle of discharge to any of *four* positions, and – presto! – the job is done. No oil cups snarl service due to IM-pak's sealed ball bearings. Blowers are also available with a specially designed interchangeable sleeve bearing mount which is easily adjustable and permits rapid production-line switches to your requirements. This fast-adapting blower is another outstanding example of Utility's never-ending search for better engineering methods that pay off where it counts – in lower labor costs, reduced inventories and trouble-free service in your equipment. *YOU CAN'T MATCH UTILITY FOR PRODUCT AND PRICE!*

*INTERCHANGEABLE MOUNTING

A Division of Utility Appliance Corp.

UTILITY FAN CORP. *911 East 59th Street, Los Angeles 1, California*

MANUFACTURERS OF HEAVY AND STANDARD DUTY BLOWERS FOR HEATING, AIR CONDITIONING AND VENTILATING INSTALLATIONS. PRODUCERS OF BLOWERS AND BLOWER PARTS FOR ORIGINAL EQUIPMENT MANUFACTURERS. WRITE FOR CATALOGUE DATA.

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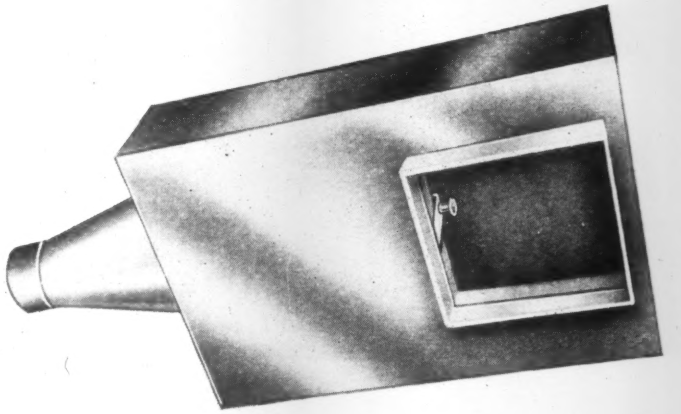
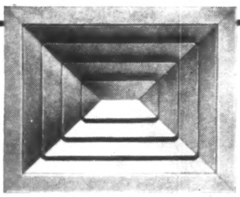
AGITAIR® HIGH PRESSURE TERMINALS ...DISTINCTIVE AIR DIFFUSERS

AGITAIR High Pressure Terminals and noise attenuation boxes are the development of Air Devices Inc. engineers after years of research, laboratory and field work in the control and distribution of air through high velocity ducts.

These AGITAIR High Pressure Terminals combine all the practical operating features demanded by engineers to assure 100% control of high velocity air. AGITAIR High Pressure Terminals are available in a variety of types and styles.





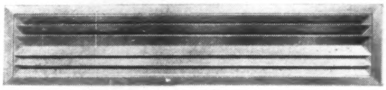
"RC"

PATTERNS UNLIMITED

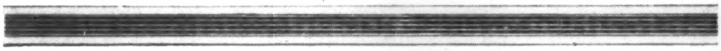
CORRECT AIR DISTRIBUTION

To assure noiseless, draftless distribution of air from AGITAIR High Pressure Terminals, there is a complete line of AGITAIR distinctive diffusers that can be employed to meet any job requirement.

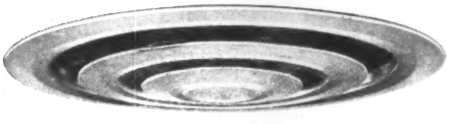
Separate catalogs are available containing informative, useful engineering data for each type AGITAIR diffuser —Type RC series (Square, Rectangular and Continuous)—Stripline (Slot Type) and Circular (Adjustable and Non-Adjustable.) Ask your AGITAIR representative for your copy of these catalogs or write direct to Air Devices Inc.



"RC" CONTINUOUS
(1 - 2 way blows)



STRIPLINE — SLOT TYPE
(1 - 2 way blows)



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ADJUSTABLE & NON-ADJUSTABLE

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AIR DEVICES INC.

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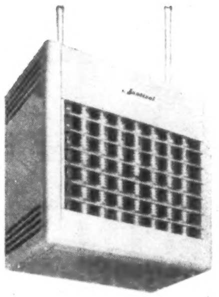
"We've put an end to unit heater failures by replacing with Janitrols"



More *Janitrol* Gas-Fired Unit Heaters are specified to replace heating "failures" than any other kind!

Any unit heater brand can *claim* dependability and long, economical service life.

But only when such claims are backed by actual performance records are you on firm ground when it comes to buying!

Consider this: Less than ¼ of 1% of over a million Janitrol Multi-Thermex heat exchanger tubes installed since 1940 have failed for all causes. That's proof of performance you can count on for dependable heating and extra years of care-free service.

No wonder Janitrol gas-fired unit heaters are first choice to replace the "failures" are re-specified time after time for plant additions, modernizing, new construction.

Janitrol unit heaters are available for "dual-fuel" operation; can be installed to heat with either LP gas or natural gas, and may be switched from one fuel to the other automatically to meet needs of users in areas where natural gas is not always available.

Engineering Ingenuity in gas unit heating by Janitrol

For complete information on Janitrol gas unit heaters and their installation, write for booklet JS-221—"Engineering Ingenuity in Gas Unit Heating". Or, ask your Janitrol dealer for a copy.

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GAS-FIRED UNIT HEATERS

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SURFACE COMBUSTION CORP., COLUMBUS 16, OHIO
IN CANADA: MOFFAT HEATING AND AIR CONDITIONING
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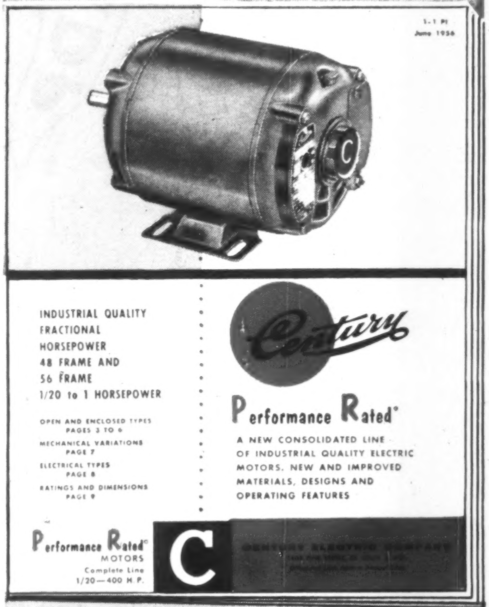

1-1 PI
June 1956

INDUSTRIAL QUALITY
FRACTIONAL
HORSEPOWER
48 FRAME AND
56 FRAME
1/20 to 1 HORSEPOWER

OPEN AND ENCLOSED TYPES
PAGES 3 TO 6
MECHANICAL VARIATIONS
PAGE 7
ELECTRICAL TYPES
PAGE 8
RATINGS AND DIMENSIONS
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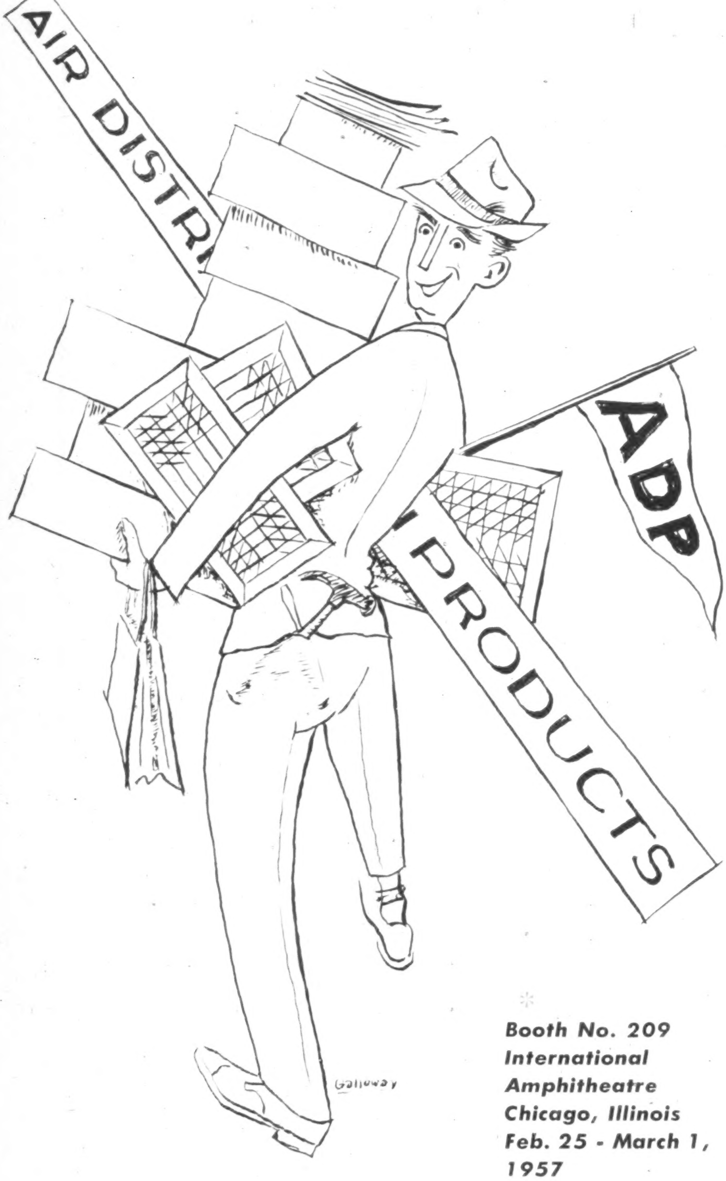

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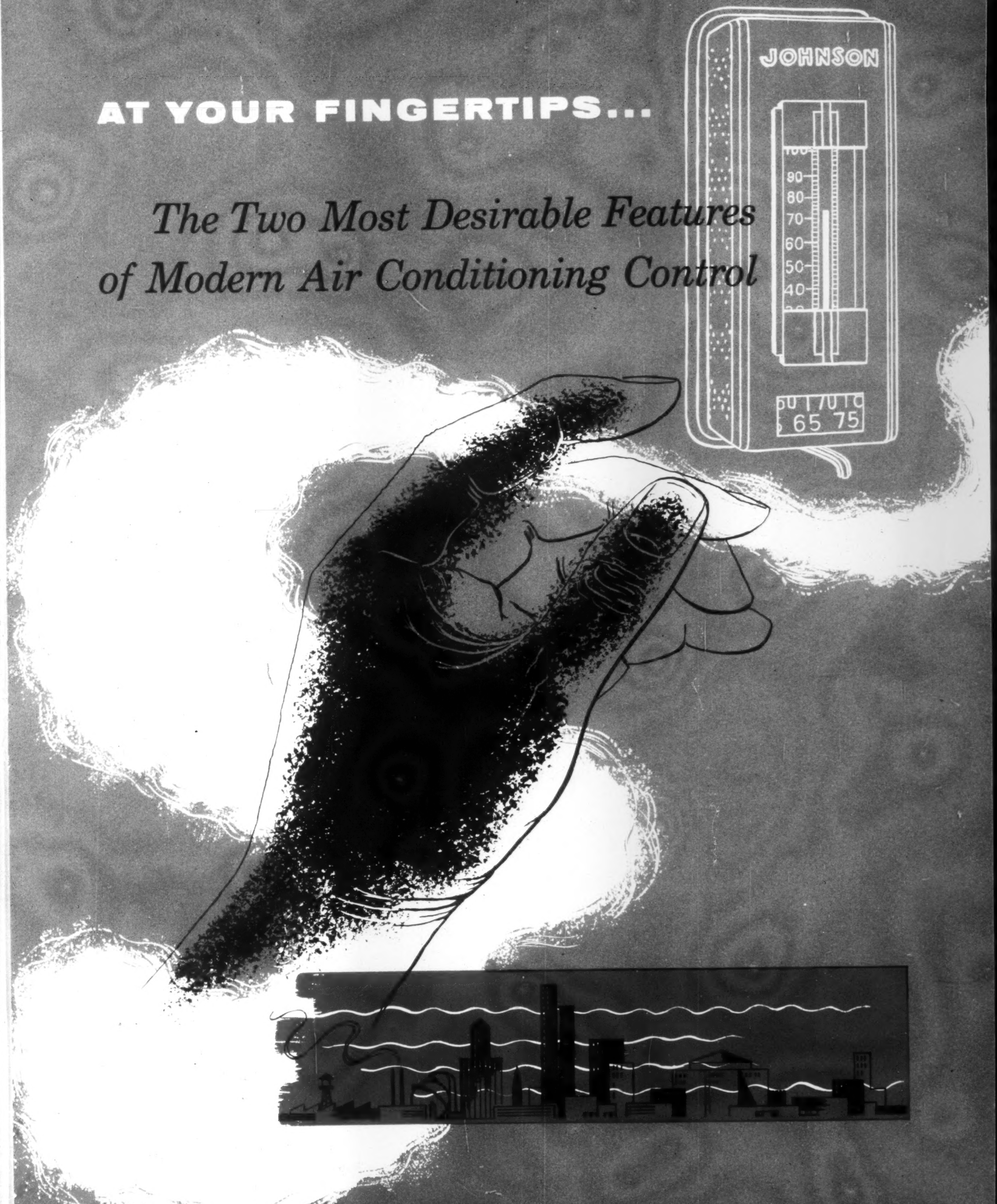
AT YOUR FINGERTIPS...

The Two Most Desirable Features of Modern Air Conditioning Control



A REPORT ON THE FUNDAMENTAL ADVANTAGES OF THE WORLD'S FINEST CONTROL SYSTEMS FOR OFFICES, FACTORIES, STORES, HOSPITALS, HOTELS, SCHOOLS, PUBLIC AND COMMERCIAL BUILDINGS

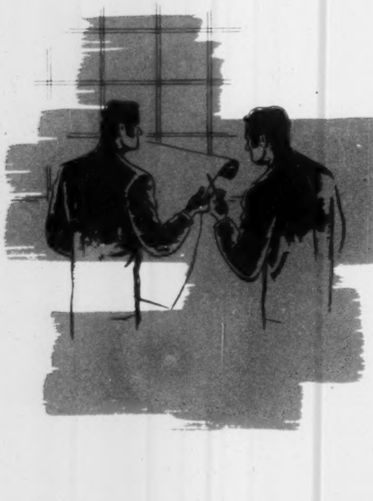
1. THE FLEXIBILITY
2. THE SIMPLICITY
of Johnson

The age of air conditioning poses new and challenging problems in the selection of control systems – problems resulting from progressively higher comfort standards, from changing architectural concepts and from the frequent introduction of new and better air conditioning equipment.

Out of this multiplicity of problems has come a twofold demand on the part of architects, engineers, builders and owners:

FIRST, for control systems that are so adaptable, so technically perfect, that they are fully capable of solving even the most intricate of these problems.

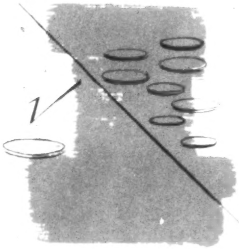
SECOND, to provide perfection of performance without sacrificing any of the matchless simplicity of pneumatic operation.



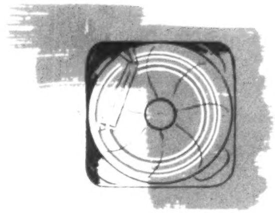
Discover for yourself how pneumatic control – and only pneumatic – successfully combines these two all-important characteristics to an extent that can't be duplicated! No other method of control – only pneumatic – can satisfy modern control requirements so completely and so efficiently, yet so simply and economically! Here are the facts from Johnson, the leader in pneumatic control systems for over 70 years.

Pneumatic Control

PNEUMATIC SIMPLICITY GIVES YOU THESE EXCLUSIVE ADVANTAGES



1 **FEWER COMPONENTS.** The key to control system simplicity lies in few and simple components. Johnson Pneumatic Control Systems consist of the *fewest possible* number of components. Regardless of how few or how many features you need to provide effective air conditioning control, it's simpler to do it pneumatically. *To produce comparable results by electronic or electric power, or any other method, requires a far greater number of parts and a vastly more complex control system to plan, install, supervise, maintain and service.*

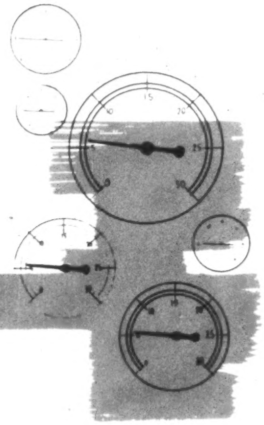


2 **GREATER RELIABILITY.** Not only are pneumatic components fewer in number but, individually, they are much less vulnerable to failure and damage than other types of components. *The parts of a Johnson Thermostat, for example, will outlast the equivalent parts used in any other type of system.*

With Johnson Pneumatic, there is no intricate array of fragile parts, no cycles of deterioration requiring frequent, regular replacement of delicate components, no gradual loss of control characteristics to upset system balance. Short circuits, electrical overloads, voltage variations and similar problems have no effect whatsoever on Johnson Pneumatic Systems.

Because pneumatic apparatus is basically so accurate, so dependable, so free from extraneous influences, there's no need to be constantly preoccupied with checking component performance and making endless adjustments.

Where real system reliability is essential—to insure uninterrupted comfort or to protect products and processes—Johnson Pneumatic Control meets every requirement.



3 **MINIMUM UPKEEP.** Both ordinary maintenance and trouble shooting are greatly simplified with Johnson Pneumatic. There are fewer components to check, fewer moving parts subject to wear. Control pressure gauges, located throughout the system, provide an instant, on-the-spot check of performance *without shutting down the heating, ventilating or air conditioning system.* Expensive testing equipment is unnecessary. And only pneumatic gives you the choice to repair or replace components. Thanks to universal familiarity with the principles of pneumatic operation, ordinary service adjustments can be performed at nominal cost by the owner's own staff.

With other forms of control, servicing and trouble shooting are much more difficult and considerably more costly. Owners must be prepared against sudden breakdowns by carrying inventories of spare components. When trouble develops, a number of components must be checked with test equipment, usually with the system shut down. Test apparatus is expensive and difficult to apply. During adjustment, it is difficult to observe how the components are functioning since *there is no permanently installed equivalent to the pneumatic control pressure gauge.*

Few buildings have employees capable of providing such service. Owners are forced to depend on the scattered service facilities of manufacturers. *Only pneumatic gives you unlimited ability to check performance and to do it surely, inexpensively and promptly.*

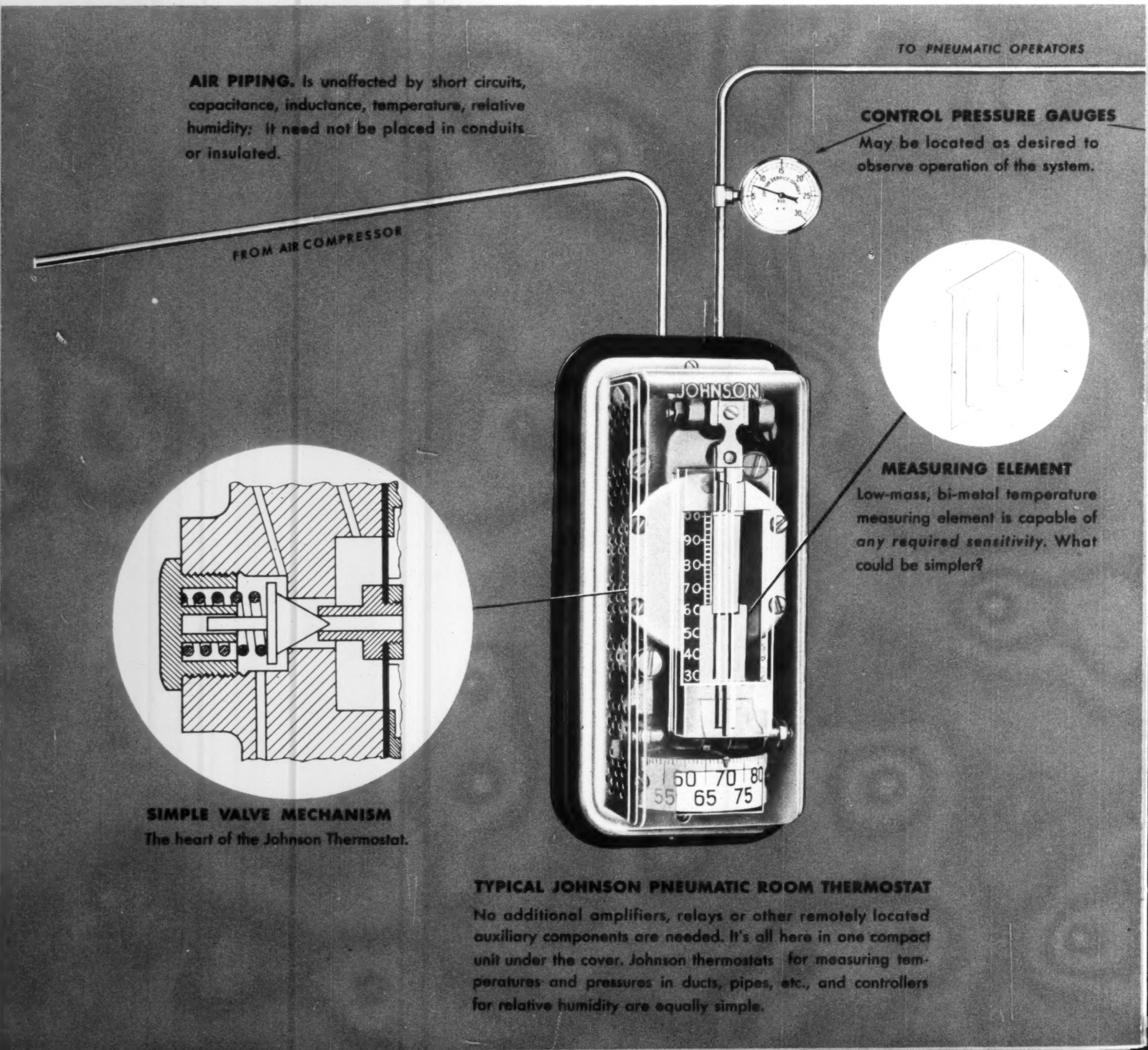
Simplicity, alone, is reason enough to justify the selection of pneumatic control, for it is by far the most practical, most economical of all forms of control. As the following pages show, it's this very simplicity that also makes possible standards of performance that are unsurpassed by anything else you can use, regardless of cost!

ONLY PNEUMATIC GIVES YOU

The basic components of Johnson Pneumatic Control, shown below, reveal how remarkably simple and free from complication the best air conditioning control systems can be.

The Johnson Room Thermostat—the world's most accepted thermostat—is a refined reducing valve in a compressed air line, set and reset automatically by an accurate bi-metal temperature measuring element, to transmit compressed air, at varying pressures, to valves, dampers and other devices.

Johnson Diaphragm Valves and Damper Operators are equally simple devices with flexible, long-life diaphragms which are moved as the thermostat transmits



AIR PIPING. Is unaffected by short circuits, capacitance, inductance, temperature, relative humidity; it need not be placed in conduits or insulated.

CONTROL PRESSURE GAUGES
May be located as desired to observe operation of the system.

MEASURING ELEMENT
Low-mass, bi-metal temperature measuring element is capable of *any required sensitivity.* What could be simpler?

SIMPLE VALVE MECHANISM
The heart of the Johnson Thermostat.

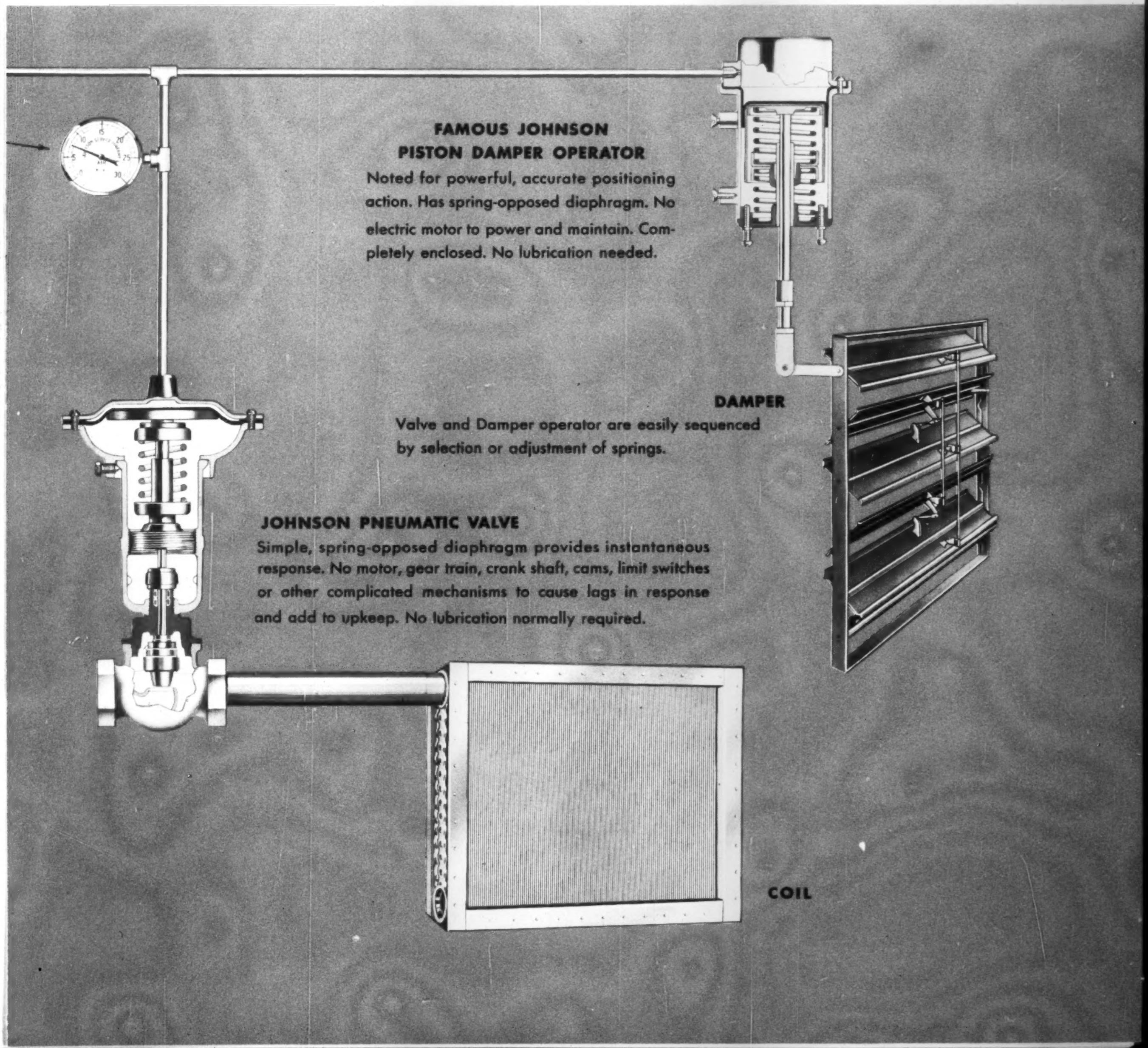
TYPICAL JOHNSON PNEUMATIC ROOM THERMOSTAT
No additional amplifiers, relays or other remotely located auxiliary components are needed. It's all here in one compact unit under the cover. Johnson thermostats for measuring temperatures and pressures in ducts, pipes, etc., and controllers for relative humidity are equally simple.

System-wide SIMPLICITY

changes in air pressure. Johnson offers the most complete line of pneumatic equipment for solving all temperature, humidity and pressure control problems.

The widespread use of pneumatic power by other industries offers further evidence of its simplicity and adaptability. Examples include truck and train brake systems, industrial power tools, hoists, bus suspension systems, lubricating equipment, machine tools and countless others.

Compare *systems* carefully. You'll discover that Johnson pneumatic apparatus is simpler by far and that you can do control work with just a fraction of the components that would otherwise be required.



FAMOUS JOHNSON PISTON DAMPER OPERATOR

Noted for powerful, accurate positioning action. Has spring-opposed diaphragm. No electric motor to power and maintain. Completely enclosed. No lubrication needed.

DAMPER

Valve and Damper operator are easily sequenced by selection or adjustment of springs.

JOHNSON PNEUMATIC VALVE

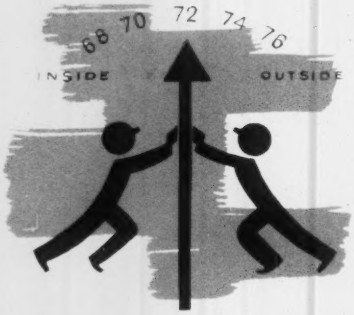
Simple, spring-opposed diaphragm provides instantaneous response. No motor, gear train, crank shaft, cams, limit switches or other complicated mechanisms to cause lags in response and add to upkeep. No lubrication normally required.

"...the state or quality of being adaptable; of being responsive to the need..."

...THAT'S *Pneumatic flexibility!*

With Johnson Pneumatic Control you get all the features you need to make any air conditioning system perform up to expectations. No matter how difficult or diversified the problems may be, pneumatic flexibility makes it far easier, simpler and more practical to produce the desired results. For example, today's streamlined pneumatic control lets you count on—

IMPROVED COMPENSATION



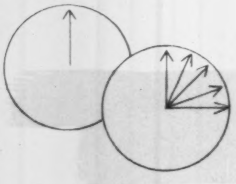
One of the essentials of a really efficient control system is the ability to provide fast, accurate compensation for *any* condition, indoors or out, that affects comfort.

With modern Johnson Pneumatic Controls and their special features, you can easily compensate for changes in occupancy levels (no matter how sudden or extreme), for the heat-producing effects of lights, office equipment or industrial processes, for changes in outdoor temperatures and exposure factors. You can avoid temperature "drift" by varying the ratio of compensation to match the weather—always maintaining the ideal relationship between indoor and outdoor conditions. You can have compensation in as few or as many zones as desired.

You enjoy uniformly comfortable temperatures. High speed pneumatic compensation takes sudden load changes in stride, holds temperatures consistently comfortable.

In judging comparative response rates, bear in mind the fallacy of basing your judgment on the speed of a single control component, when, actually, it's *system response* that determines how fast you get corrective action. Johnson Pneumatic supersensitive controllers, capable of any required sensitivity, team up with other pneumatic components to produce corrective action in a much shorter elapsed time than that needed by any other control system. *For the fastest system response, you have to go pneumatic!*

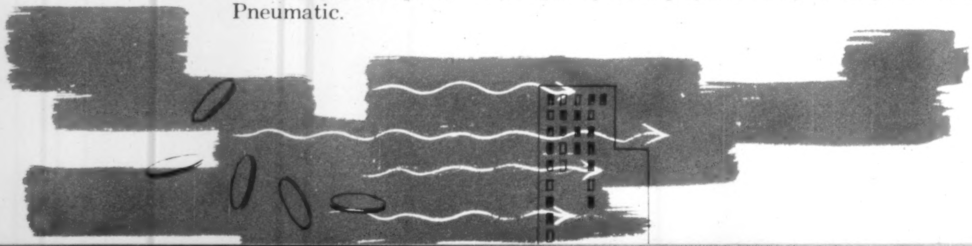
And, thanks to the precise stabilizing action of Johnson Submaster Thermostats, pneumatic compensation provides corrective action without "hunting," without over-compensating.

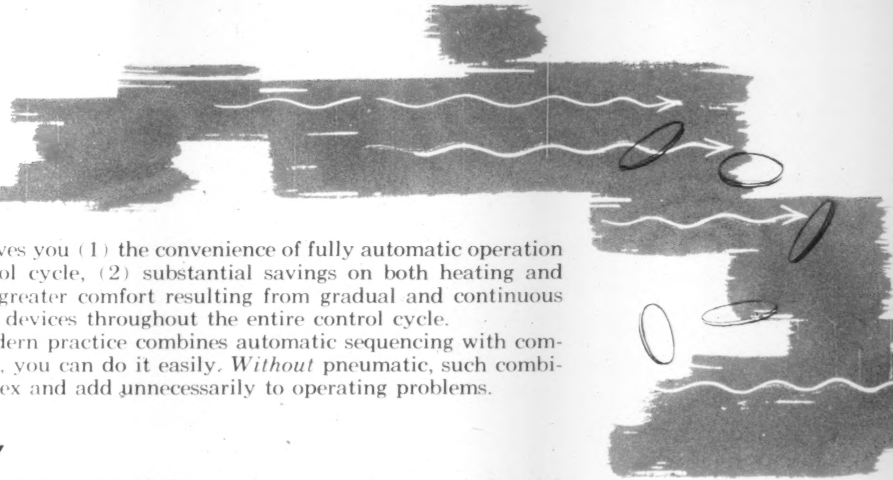


Without pneumatic, it is difficult to set limits when modifying control ranges. You get what amounts to "runaway" compensation. Whether you want them to or not, thermostats go on compensating indefinitely, allowing temperatures to pass practical limits. Only pneumatic gives you *fully controlled compensation*, within definitely established upper and lower limits.

AUTOMATIC SEQUENCING

Precise automatic sequencing adds immeasurably to air conditioning efficiency. Automatic change-over from heating to cooling operation, the Johnson-pioneered "economizer" cycle for inexpensive, natural cooling with outdoor air, weekend cut-out cycles, separate day-night operating cycles—they're all yours with Johnson Pneumatic.





Pneumatic sequencing gives you (1) the convenience of fully automatic operation through any desired control cycle, (2) substantial savings on both heating and cooling costs and (3) the greater comfort resulting from gradual and continuous operation of the controlled devices throughout the entire control cycle.

Remember, too, that modern practice combines automatic sequencing with compensation. *With* pneumatic, you can do it easily. *Without* pneumatic, such combinations are far more complex and add unnecessarily to operating problems.

MAXIMUM SAFETY

Where safety is a factor—as it is in hospital operating rooms, in many industrial plants and research laboratories—it properly takes precedence over any other consideration. The answer, obviously, is to go pneumatic, for only pneumatic insures complete protection under hazardous conditions.

Pneumatic control is explosion-proof. You can locate Johnson Thermostats, Humidostats and other apparatus anywhere in complete safety, even in the presence of explosive gases, solvents, dusts and other hazardous materials. Here, again, pneumatic flexibility pays off—there's no need to compromise safety, no need to settle for less effective, substitute control arrangements, no need to install special protective devices. Flow of instrument air is always outward, preventing room contaminants from damaging working parts of the instrument.

SIMPLIFIED OPERATION

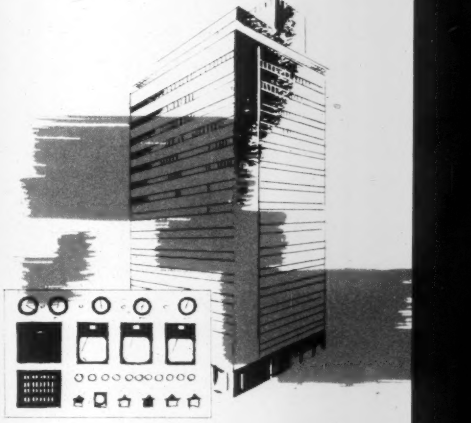
Only pneumatic control gives you unlimited freedom to observe and direct system operation. Whichever way is most convenient, most effective, you can do it pneumatically.

Johnson Control Centers give you the advantage of central control panels which, from a single remote point, allow you to observe and record air and water temperatures throughout the system, reset thermostats, make day-night and heating-cooling change-overs, vary outdoor air for ventilation and cooling. In short, you can do everything from one convenient location.

Sometimes, though, it's more practical to use *de*centralized control, grouping controls on zone panels. Or you may want a separate control panel for each central unit, mounted right at the unit. Pneumatic flexibility lets you do it either way.

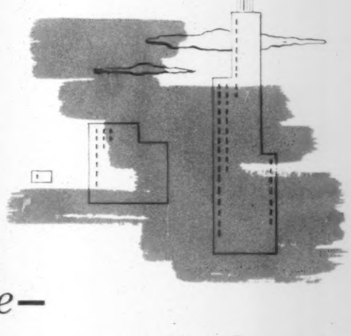
The system-wide display of performance data, by means of unlimited numbers of inexpensive control pressure gauges, adds tremendously to operating convenience and efficiency. Even the most comprehensive central control panels can't substitute for the time and effort saved by having this vital information available at the actual point of control. It's one of pneumatic's most important advantages and it's exclusive with pneumatic!

Thermostat operation is likewise flexible. You can change settings at the thermostat itself or provide for remote adjustments from a central control panel. Locked and concealed adjustment-model thermostats are effectively used to prevent tampering. Keep in mind, too, that pneumatic simplicity eliminates personnel headaches. Experienced personnel, already familiar with pneumatic devices, are generally available. Almost anyone with mechanical aptitude or experience can quickly become competent to operate today's simplified pneumatic systems. The inherent complexities of other methods of control and the difficulty of making proper observations of performance only add needlessly to the owner's problems and costs.



WIDEST ADAPTABILITY

In contrast to the limited applications of other controls, only pneumatic control is capable of providing optimum results with all types of air conditioning systems. This applies to central fan systems, radiant heating and cooling panels, reverse cycle systems, unit air conditioners, double or single duct systems. Pneumatic alone possesses sufficient flexibility to take any job in stride.



only pneumatic is so completely flexible—

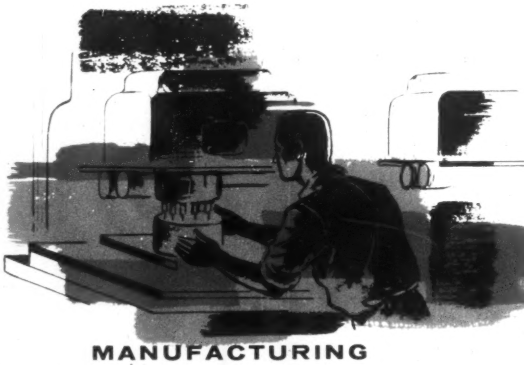
yet so simple, so economical

JOHNSON "SERVICE"

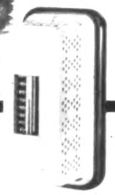
A 72-year success story

complete responsibility centered in one organization

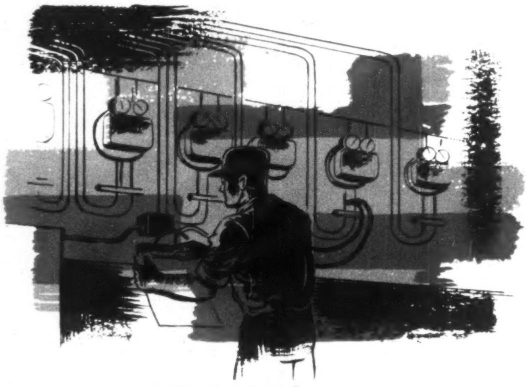
PLANNING



MANUFACTURING



INSTALLING



SERVICING

The Johnson Service Company maintains the *only* nationwide organization devoted exclusively to planning, manufacturing, installing and servicing automatic temperature and air conditioning control systems. This undivided responsibility for, and continuing interest in, all phases of the control job is your assurance of satisfaction with every Johnson Pneumatic Control System.

To serve you promptly and efficiently, there are 105 direct branch offices in the United States and Canada, each with a complete staff consisting of branch manager, sales engineers, technicians, superintendent of installations, clerks and mechanics. In addition, Johnson maintains the finest service organization in the control industry, with full-time factory-trained mechanics stationed in some 200 cities.

JOHNSON CONTROL

SINCE 1885

JOHNSON SERVICE COMPANY
Milwaukee 1, Wisconsin
Export Division, New York 16, N. Y.

JOHNSON TEMPERATURE REGULATING COMPANY OF CANADA, LTD.
Toronto 16, Ontario

Printed in U. S. A.

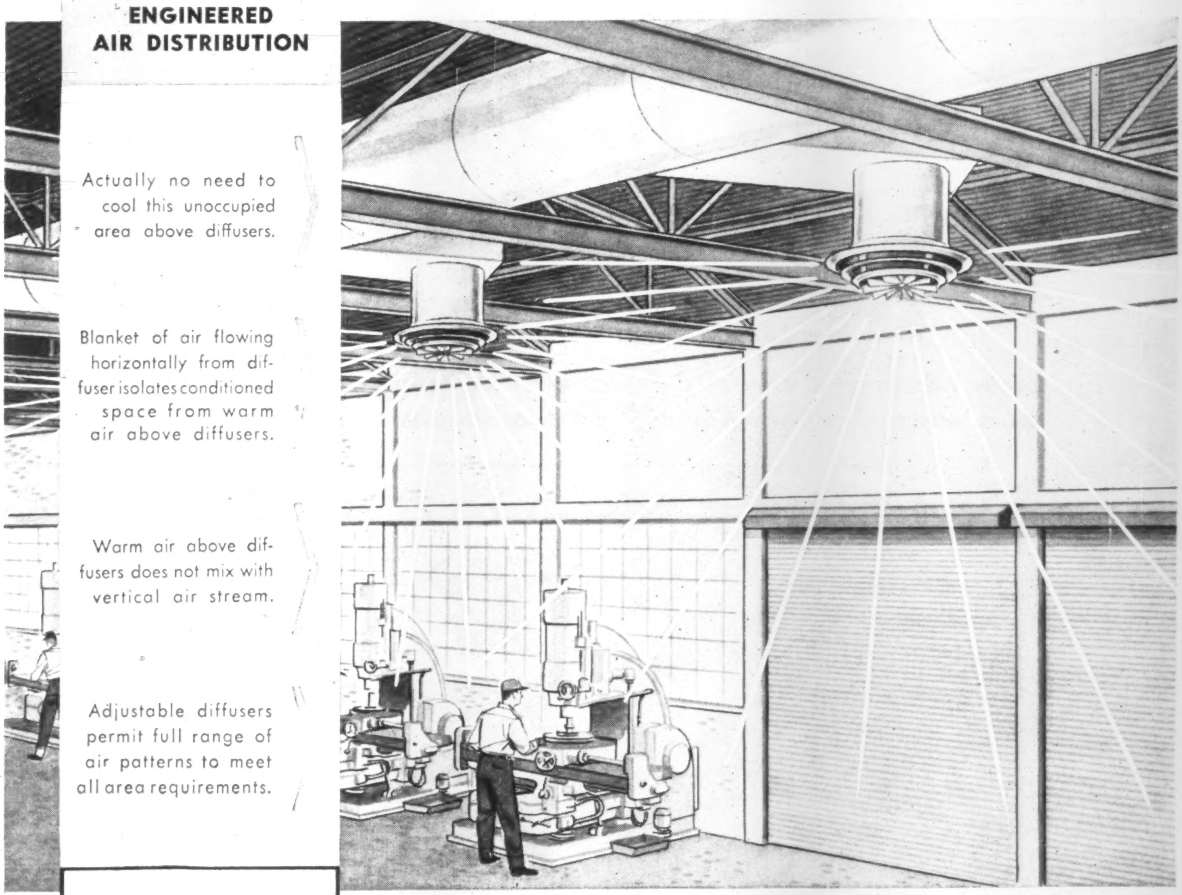
THE MARK OF QUALITY

BARBER COLMAN

Uni-Flo

ENGINEERED AIR DISTRIBUTION

Industrial Venturi-Flo Diffuser reduces waste cooling of overhead space

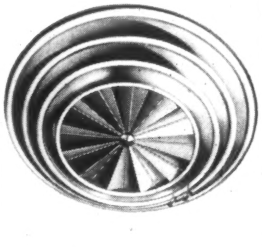


Actually no need to cool this unoccupied area above diffusers.

Blanket of air flowing horizontally from diffuser isolates conditioned space from warm air above diffusers.

Warm air above diffusers does not mix with vertical air stream.

Adjustable diffusers permit full range of air patterns to meet all area requirements.



New Model BP Industrial Venturi-Flo Diffuser for high or low ceiling cooling and heating in industrial plants, gymnasiums, auditoriums, hangars, TV studios, etc.

Now you can efficiently deliver spot or area cooling from an unfinished ceiling and virtually ignore the heat load of the large unoccupied space overhead.

Performance of the new Industrial Venturi-Flo Diffuser, as illustrated here, is guaranteed by Barber-Colman Company when diffusers are applied in accordance with published data.
Get complete details from your nearby Field Office, or write us today!

Only Barber-Colman Company combines skills in *both* air distribution and automatic controls for *undivided* responsibility.

BARBER-COLMAN COMPANY

Dept. N, 1101 Rock Street, Rockford, Illinois. Field Offices in principal cities

THE MARK OF QUALITY

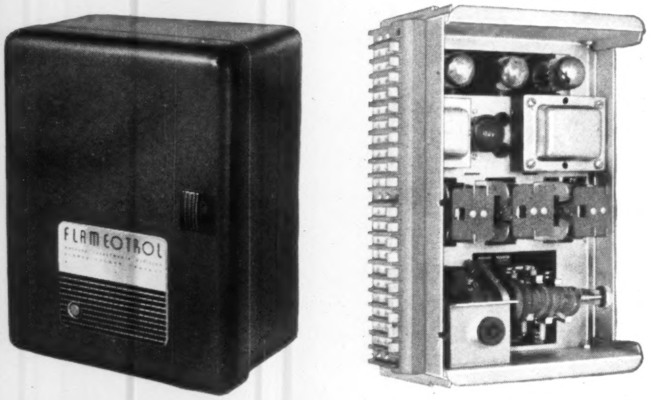
BARBER
COLMAN

why Industry specifies WHEELCO Instruments

New advanced designs provide peak operating efficiency and simplified service throughout entire instrument line

---

new automatic electronic FLAME-OTROLS



Model 1574 Flame-otrol with cover in place and removed. Note exclusive Wheelco terminal strip that guarantees uniform contact pressure while permitting easy removal for examination and adjustment.

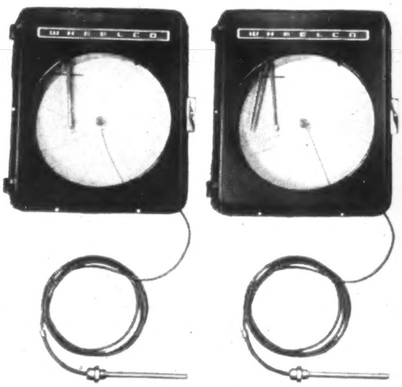
New, automatic Flame-otrols — designed to meet the exacting standards set for package boiler operation — provide every installation with the plus features that pay off in performance. Two automatic models are available to suit requirements of various installations. Model 1474 uses flamerods and emissive-type photocells as sensing elements, while Model 1574 uses lead-sulphide photo-conductive cells.

TROUBLE-FREE OPERATION, LONG LIFE, AND SIMPLIFIED MAINTENANCE OF Wheelco FLAME-OTROLS RESULT FROM THE FOLLOWING FEATURES:

- Compact, plug-in design
- Heavy-duty construction
- Use of standard electronic tubes throughout
- Convenient checking strips permitting use of standard instruments for checking circuits and voltages
- Delayed "safe-start" for realistic "flame-off" proving period

LEARN MORE ABOUT Wheelco — SEE US IN BOOTH 711
AT THE HEATING AND AIR CONDITIONING EXPOSITION

new THERMOMETERS for Indicating, Recording, and Controlling



Recording thermometer (left) and controller (right) show how Wheelco combines the latest engineering developments into an attractive, streamlined package that features unprecedented ease of service.

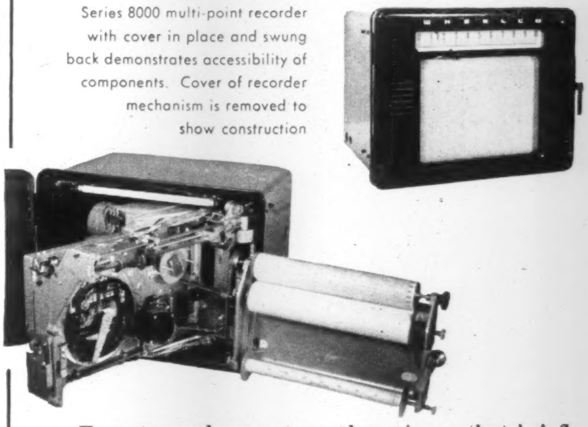
Standout features are packed beneath the gasket-sealed, die-cast aluminum case of each new Wheelco thermometer whether it is designed for indicating, controlling, or recording service. Standard ranges of these mercury-actuated instruments are from –40 to 1000° F.

OTHER "ADVANCE DESIGN" FEATURES OF Wheelco THERMOMETERS INCLUDE:

- Variety of control forms on plug-in chassis
- Invar metallic compensation for case
- Friction-free pen arms
- Electronic control action for controllers with the Wheelco Electronic Link
- Large, easy-to-read scales on indicators
- Electric clock chart drives
- One, two, and three-pen recorders available

Multi-point RECORDERS for Gathering System Temperatures

Series 8000 multi-point recorder with cover in place and swung back demonstrates accessibility of components. Cover of recorder mechanism is removed to show construction



Easy to read, operate, and service — that briefly is the story of Wheelco Series 8000 multi-point recorders. A null balance instrument designed for long life, the Wheelco multi-point obtains measurements with sensing units such as thermocouples, radiation detectors, etc. where measured variable can be resolved into an electrical signal.

WITH Wheelco SERIES 8000 MULTI-POINT RECORDERS, YOU ALSO GET:

- Up to six limit switches for high and/or low signal indication
- Single or multi-color printing
- Fast cross chart speed
- Recording of as many as 16 points on one chart
- Ready accessibility of components for service

BARBER-COLMAN COMPANY

DEPT. N, 1501 ROCK STREET, ROCKFORD, ILLINOIS, U. S. A.
BARBER-COLMAN of CANADA, Ltd., Dept. O, Toronto and Montreal, Canada

Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Electrical Components
Small Motors • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

YORK "FOOT-HIGH" room units give architects, builders more freedom in room design, construction.

YORK PRIOR PLANNING SERVICE aids architects when designing air conditioning systems to fit the job

- Saddling an architect with a bulky air conditioning unit makes his task harder, forces him to compromise designs.
- York provides Air Conditioning systems to fit the job, giving architects a freer hand to develop their designs along truly functional lines.
- The new "foot-high" York induction unit typifies York advances in meeting today's requests of architects and consulting engineers for smaller, more compact, more attractive systems.

PRIOR PLANNING SERVICE is the name York gives to its program of working with your architect, consulting engineer, builder, and you — from the very first planning stage until your complete air conditioning system is installed and operating. One of the big reasons that York can offer such a valuable complete service is the variety and ingenuity of York equipment designs. York builds the system to fit the building.

New Unit design gives architects more freedom of room design. The new York "foot-high" air conditioning unit shown at the left is a good example of York's ability to meet difficult specifications. Only twelve inches high, this unique unit is designed to allow architects to specify full length windows. Offices using a YORK system with the new "foot-high" room units will seem — and be — more spacious, lighter, and yet just as comfortably cooled and ventilated as they are with other type York Units.

York equipment allows for special building designs and room arrangement. Out of sight, other York developments aid the architect and builder. Powerful York Turbomatic compressors, for example, are light enough to be mounted on high floors, without expensive structural changes; and they are smaller, too, leaving more rentable space.

York's PRIOR PLANNING SERVICE depends upon the superior engineering ability of the carefully trained York sales engineer. This York sales engineer can be one of your most valuable aides when planning your air conditioning. Call him early in your planning or write York Corporation, subsidiary of Borg-Warner Corporation, York, Pennsylvania.

VISIT YORK CORPORATION EXHIBIT — BOOTH NUMBER 32 (IN THE ARENA)

at 13th International Heating and Air Conditioning Exposition, International Amphitheatre, Chicago—Feb. 25 to Mar. 1

York® refrigeration air conditioning

YORK B-W BORG-WARNER

the quality name in air conditioning

HEADQUARTERS
FOR MECHANICAL COOLING
SINCE 1885

YORK
CORPORATION
SUBSIDIARY OF BORG-WARNER CORPORATION

now . . . from

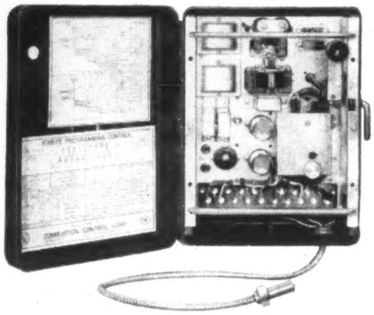
fireye®

ONE SOURCE with UNDIVIDED RESPONSIBILITY

a complete line of controls
and valves
for commercial and industrial
burners . . . automatically,
semiautomatically, or
manually ignited

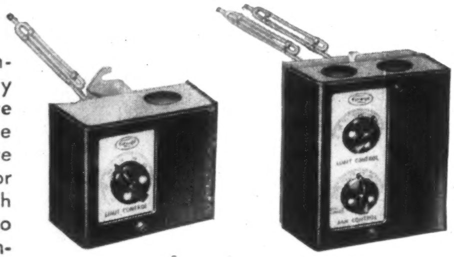
SAFEGUARDS and PRIMARY CONTROLS

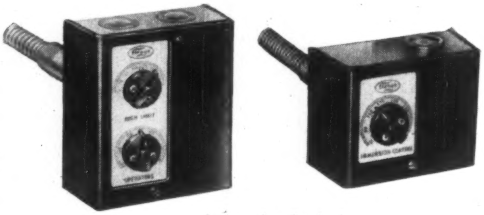
The FP-2 and FJ-2 systems provide complete flame-failure protection and programming for automatically ignited burners. Shut off fuel in 2 to 4 seconds after flame failure. Limit trial for ignition. Purge combustion chamber before and after firing.

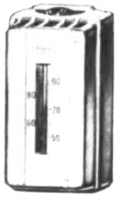

System FP-2 for industrial burners

OPERATING CONTROLS

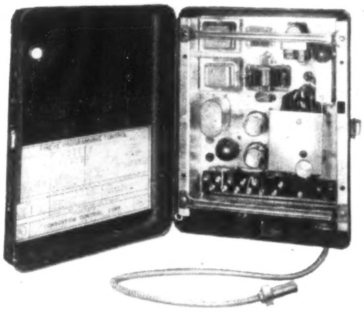
Fireye automatic controls, operated by changes in temperature or pressure, are of the highest quality. They are available individually or in combination with other Fireye controls to make a complete control system.


LIMIT CONTROL
LIMIT CONTROL
FAN CONTROL
Air Temperature Controls


HIGH LIMIT
OPERATING
IMMERSION CONTROL
Immersion Controls

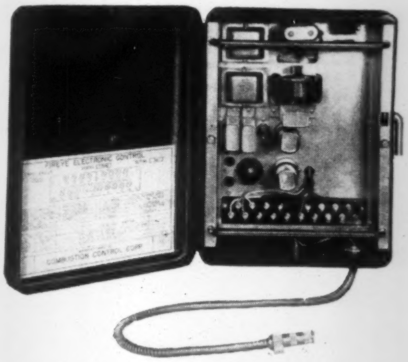

90
80
70
60
50
Thermostat

Pressure Controls



System FJ-2 for commercial burners

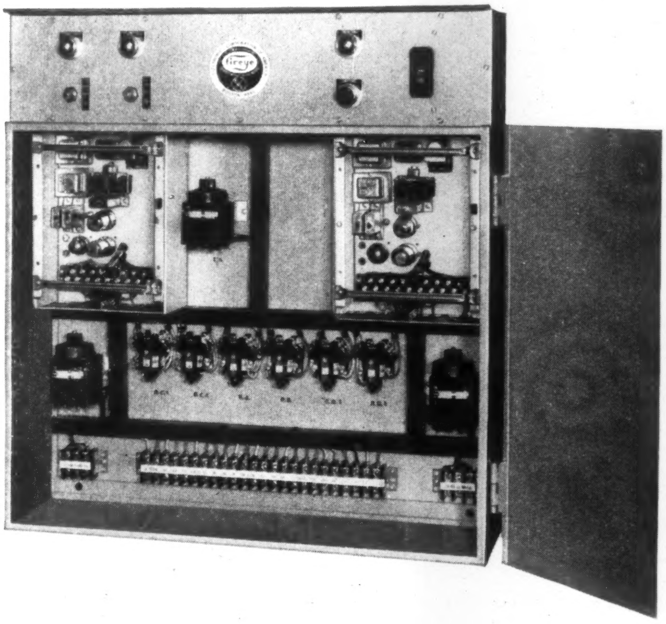
System FP-3 for flame-failure indication and alarm



System FP-4 for semiautomatically and manually ignited burners

NEW SAFETY INTERLOCK SYSTEM

The first fully integrated combustion safeguard system for multiple burner boilers . . . insures safe light-off and firing. Includes all external valves, switches and alarms in addition to pre-wired cabinet assembly.



SMOKE INDICATORS

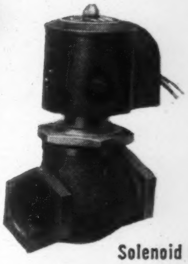
Provides low-cost, easy-to-install smoke indication with assured accurate readings. Meets *all* smoke ordinances.

System FE-3

VALVES

Leakproof closing action of these safety shutoff valves makes them ideal for automatically shutting off fuel flow to a burner in event of flame failure, fan or pump failure, power failure, etc.

Manual Reset Valves



Solenoid Fuel Valves

ECA

fireye

Other ECA Divisions: Photoswitch Division • Fireye Division • Marine Division • Business Machines Division • Photoconductor-Transistor Division • Military Division

COMBUSTION CONTROL DIVISION, ELECTRONICS CORPORATION OF AMERICA
Dept. C13-2, 77 Broadway, Cambridge, Mass.
In Canada, write Electronics Corporation of America, Canada (Ltd.) Box 111, 98 Advance Road, Toronto 18

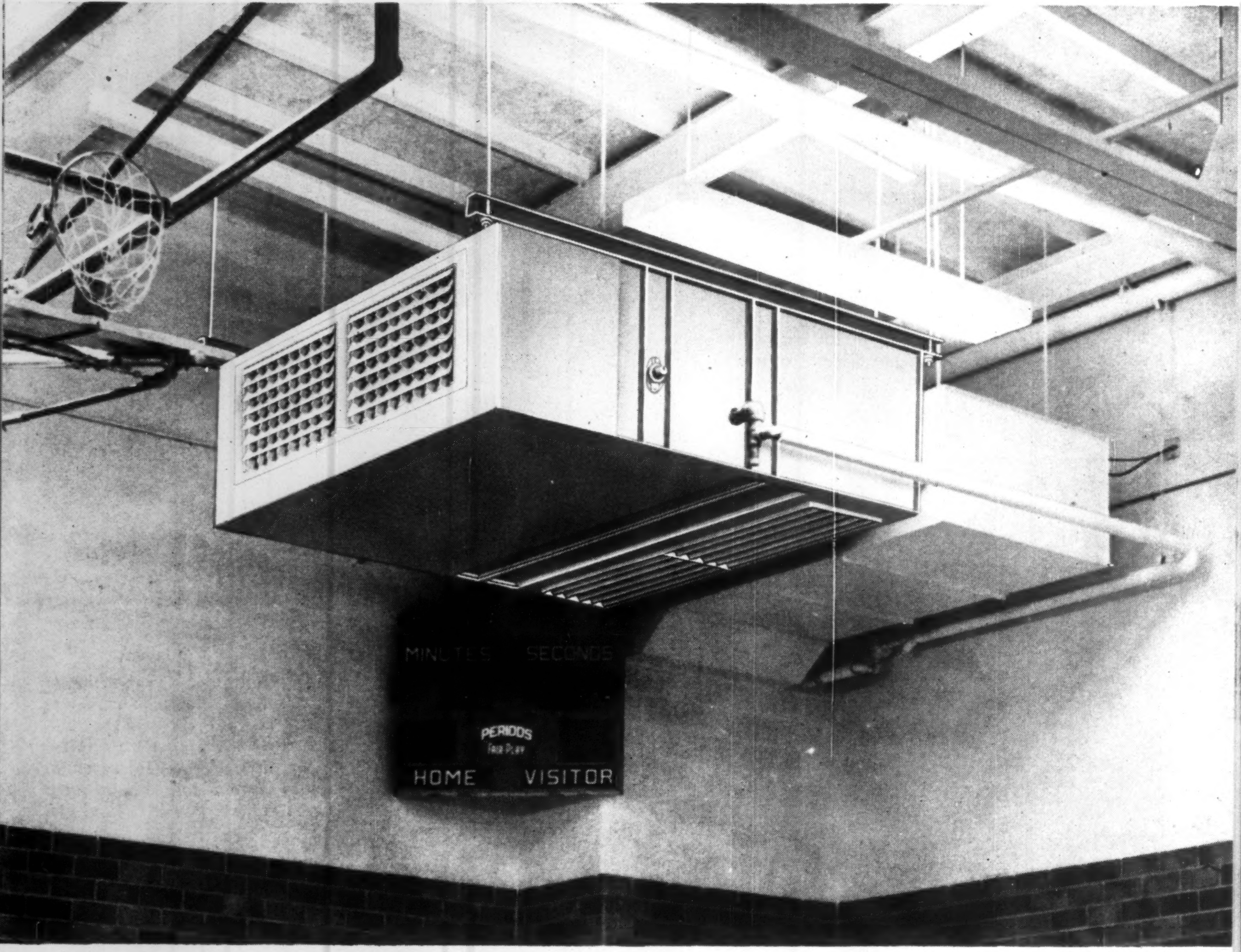
Please send literature on the following Fireye Controls:

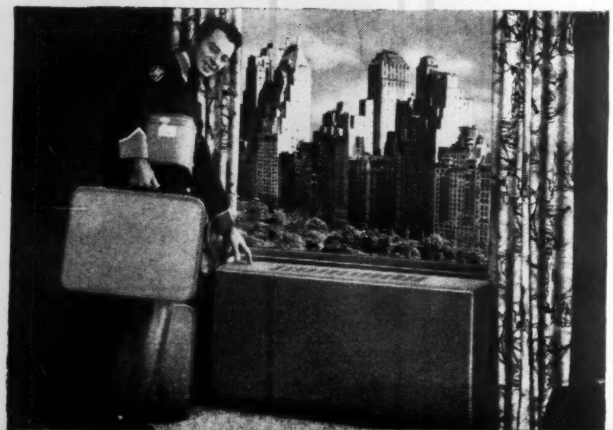
☐ Operating Controls
☐ Valves
☐ New Safety Interlock
☐ Smoke Indicators
☐ Primary Controls and Safeguards

NAME
COMPANY
ADDRESS

New models...new sizes...new designs

1957 lines the broadest matched equipment





Induction UniTrane units

Since its introduction in 1956, the TRANE induction unit has been installed in many leading buildings. Housed in an attractive cabinet so sturdy it can support a man's weight, the unit is trim, compact and efficient. Units may be ordered with or without filters for installations where it is desired to filter *all* the air—not just the primary air. Individually controlled for personal climate preference or changing needs. Available in cabinet or concealed models—for installation on wall, ceiling or floor.

in Trane history: built to work together

See this TRANE equipment at the ASHAE exposition:

- Torrivent heating-ventilating units (shown at left)
- Unit Ventilators in new shelving models
- UniTrane Induced Air units (shown at left below)
- Self-Contained Air Conditioners
- New design in Multi-Zone Climate Changer
- New design in TRANE Steam Specialties

Also: Reciprocating Compressors . . . famous TRANE CenTraVac
. . . regular Climate Changer . . . TRANE Radiation . . . Unit Heaters

See all the above at the TRANE *booth, ASHAE Exposition—International Amphitheatre Chicago—*
February 25 to March 1

Now—for 1957—TRANE brings you the industry's most complete line of heating, ventilating and air conditioning equipment! New equipment—improved equipment—in even wider ranges of sizes and capacities has been added to the line already famous for its completeness and versatility. And, remember: TRANE offers you matched equipment in all four related fields: air conditioning . . . heating . . . ventilating . . . heat transfer!

TRANE products are designed and built for use together. That means you get greater "system" dependability . . . pinpoints responsibility for *all* the equipment on the job. See the TRANE equipment for 1957 at the ASHAE Exposition in Chicago—February 25 to March 1. If you aren't planning on attending this year, call your nearby TRANE Sales Office for complete information —or write TRANE, La Crosse, Wisconsin.

◀ **Torrivent heating—ventilating units**

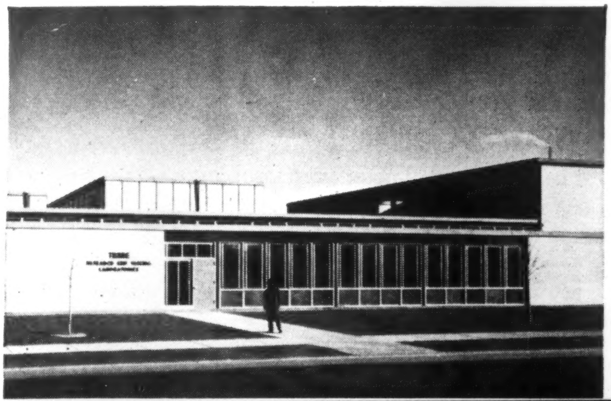
Here's a whisper-quiet centrifugal unit that both heats and ventilates! It's the newly designed TRANE Torrivent—built to furnish large capacity heating and ventilating for all types of buildings. Operation is *quiet*—thanks to new, high efficiency TRANE Fans. Use the Torrivent wherever you need a positive, dependable supply of filtered, humidified and tempered air—fresh or recirculated. Available in 1, 2 or 3 fan models in capacities from 1,250 to 33,000 cfm. Floor, ceiling or wall hung types.

For any air condition, turn to

TRANE

MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT

THE TRANE COMPANY, LA CROSSE, WIS. • EASTERN MFG. DIV., SCRANTON, PA.
TRANE COMPANY OF CANADA, LTD., TORONTO • 90 U.S. AND 19 CANADIAN OFFICES

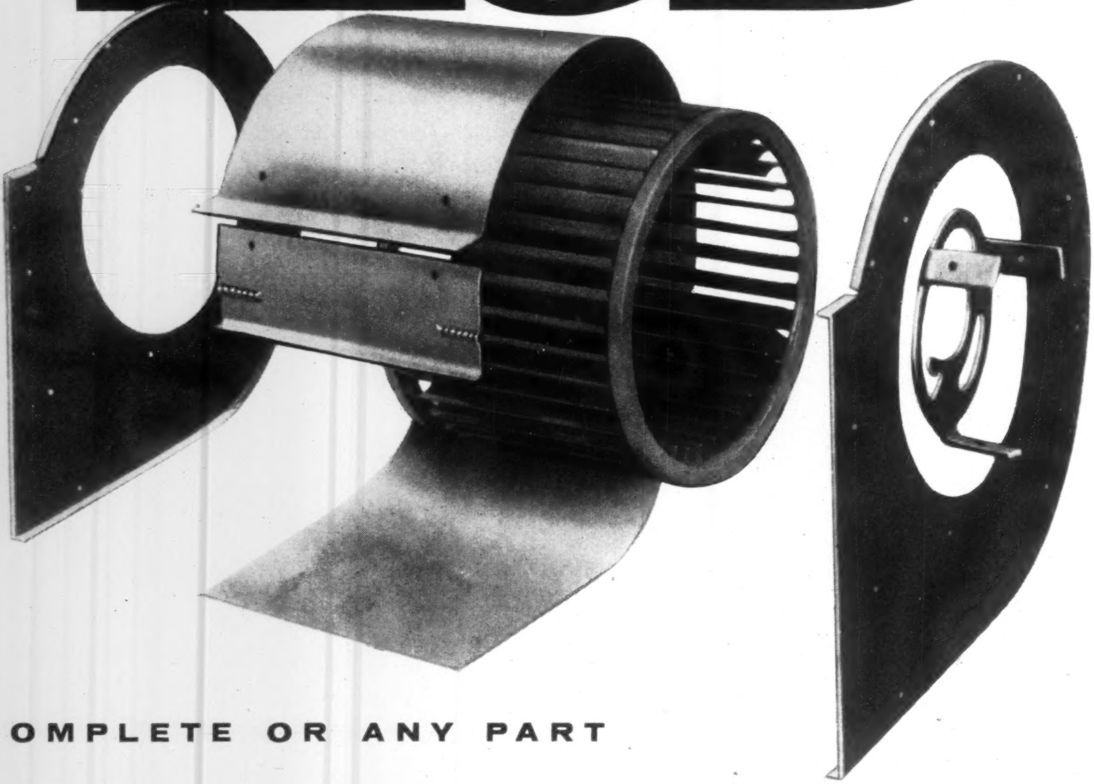


This is the TRANE "House of Weather Magic"

—the million-dollar laboratory where TRANE equipment is designed and tested. Built in 1953, the laboratory is now being made still larger, with even more facilities for the development of improved equipment. In this laboratory, terrific extremes of weather are produced—from 65° below to 2500° above! Gales up to 60 miles per hour are created to test fans and other equipment. Whatever the research problem, TRANE seeks sound engineering solutions, based on *facts*.

MORRISON CUSTOM DESIGN

MCD



COMPLETE OR ANY PART

Because of the various Morrison Blower Designs and the many component parts that go into the making of complete assemblies, M.C.D.® offers you blowers that are practically designed individually for your furnace and air conditioning units.

Meeting every requirement of space and function, overcoming all the limitations of stock blowers, M.C.D.® makes it possible for you to obtain quality produced blowers built and designed specifically for your products.

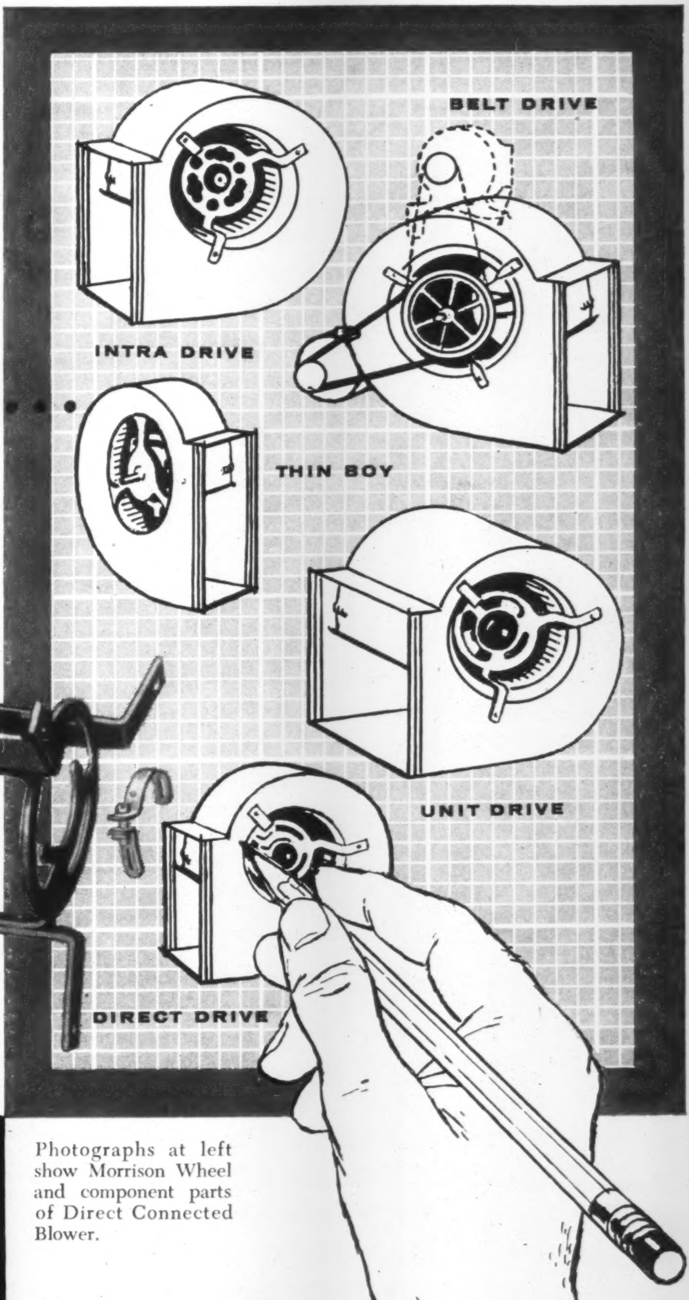
In addition to this, substantial savings are assured by the combination of standard parts produced in volume.

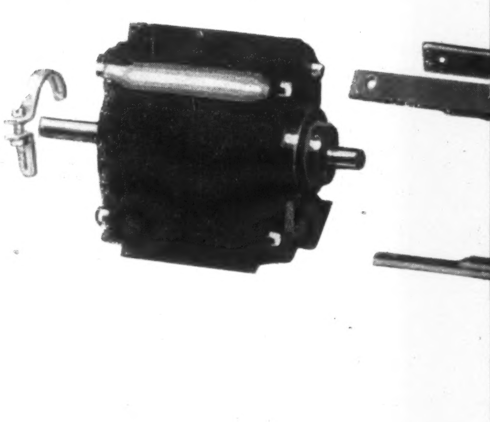
Morrison engineers will be happy to work with you — as they have with most of the leading Heating and Air Conditioning Manufacturers — for perfect distribution of air in your equipment.

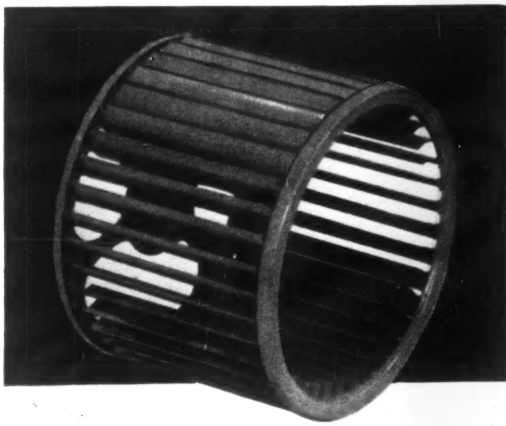
Write us today — tell us of your problems — and see if we can show you a simple "out".

MORRISON PRODUCTS

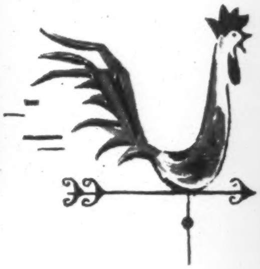
individualized
and stylized
for your
particular need . . .


BELT DRIVE
INTRA DRIVE
THIN BOY
UNIT DRIVE
DIRECT DRIVE





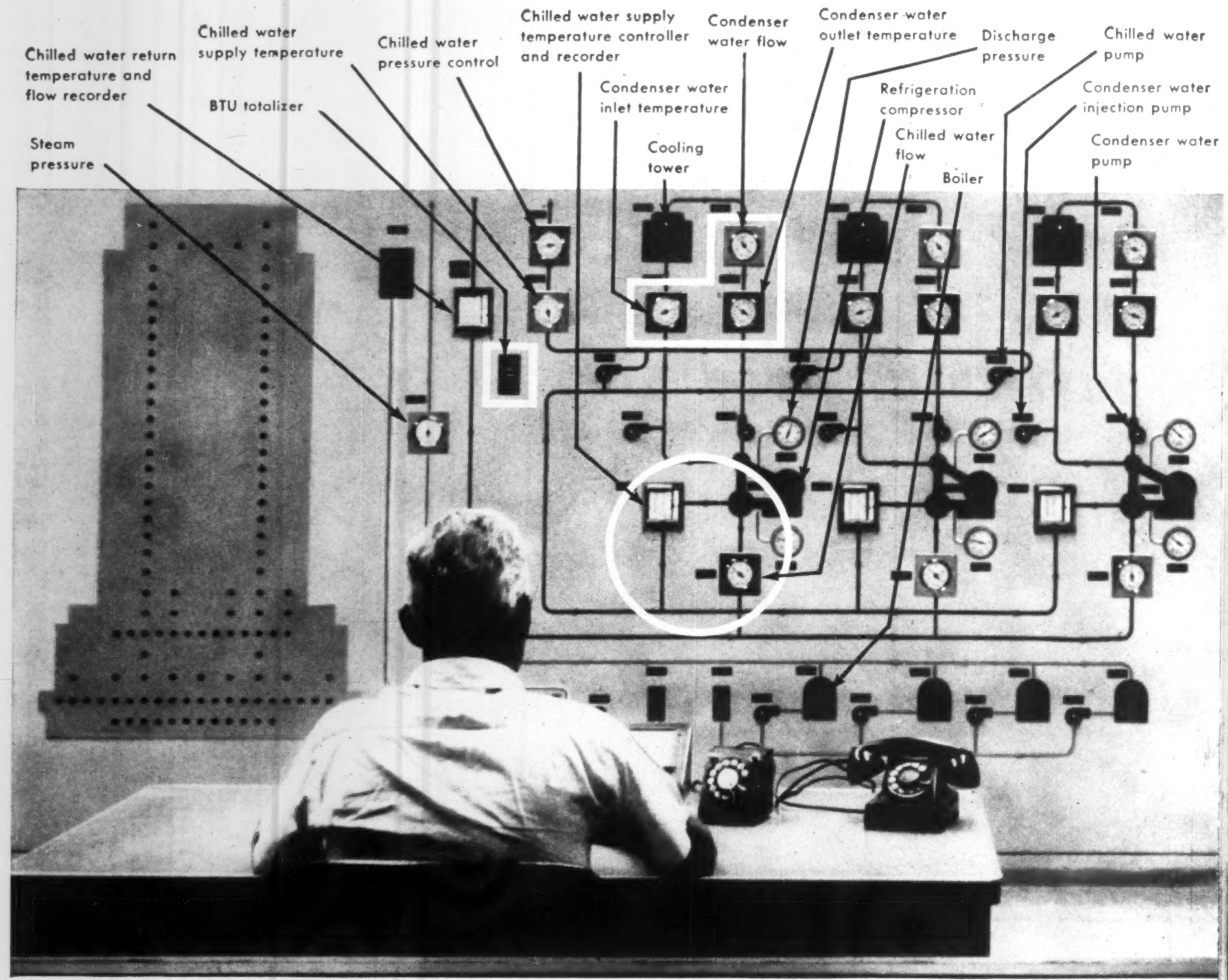
Photographs at left show Morrison Wheel and component parts of Direct Connected Blower.



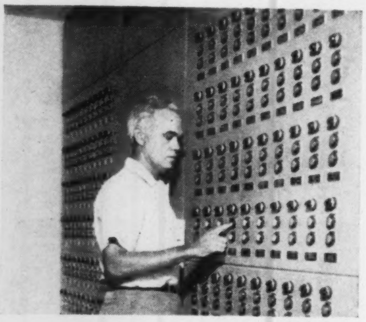
Be sure to visit us at the
International Heating and Air
Conditioning Exposition
Chicago Feb 25 to March 1st
Booth 936

INCORPORATED

16816 Waterloo Road
Cleveland 10, Ohio


Chilled water return temperature and flow recorder
Steam pressure
Chilled water supply temperature
BTU totalizer
Chilled water pressure control
Chilled water supply temperature controller and recorder
Condenser water inlet temperature
Cooling tower
Condenser water flow
Condenser water outlet temperature
Refrigeration compressor
Chilled water flow
Boiler
Discharge pressure
Chilled water pump
Condenser water injection pump
Condenser water pump

View of rear wall portion of Supervisory DataCenter in Bank of the Southwest Building, Houston, Texas. Additional panels are installed on right and left walls. One man, from this one room, controls heating—cooling system for the entire 22-story building.



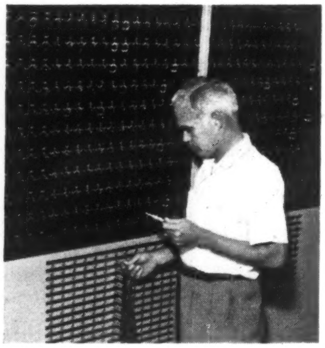
Left-Hand Panel. Located here are start-stop buttons for each electrical motor, for all pumps and fan compressors in the entire air conditioning system. Pilot lights located back of the start-stop switches and on the building outline on the back panel indicate at all times which equipment is operating.

Back Panel

⌐ The performance of each cooling tower and each refrigeration condenser may be checked by the measurement of condenser water flow and condenser water inlet and outlet temperature.

○ The performance of each refrigeration compressor may be checked by the measurement of chilled water flow and supply, and return water temperature. Chilled water supply controller indicates, records, and controls chilled water supply. Operator can change or adjust temperature at the instrument.

□ The performance of the refrigeration plant may be checked by the measurement of BTU's as shown on the digit-counter which indicates total heat transfer.



Right-Hand Panel. Here operator can change individual control point of 396 thermostats throughout the building. Exact temperatures at each thermostat can be read at a large electrical indicator. A separate electronic instrument can record simultaneously the temperature at *any* 12 locations throughout the building for analyzing system operation.

Control leadership through advanced engineering-research

Honeywell Supervisory DataCenter—Automation for Air Conditioning

"CENTER" is the key word in the name of this new Honeywell development.

For the Supervisory DataCenter concept begins with the centralization of equipment that before was scattered throughout a building.

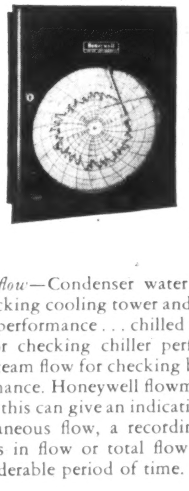
Greater operating efficiency with fewer personnel . . . longer equipment life . . . operational savings that liquidate cost . . . attractive display of your engineering-design—all this can be accomplished with the centralization made possible by the Honeywell Supervisory DataCenter.

To learn *how* these things are accomplished by the Honeywell Supervisory DataCenter see the individual panel explanations.

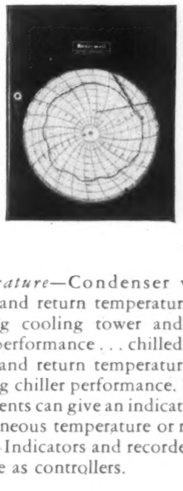
For further information about the DataCenter and other Honeywell control concepts, call your local Honeywell office. Or write to Honeywell, Dept. HA-2-46, Minneapolis 8, Minnesota.

Individual Instruments for measurement and control

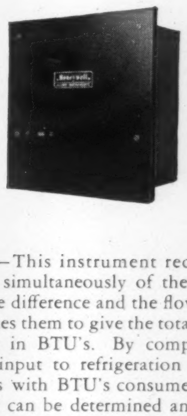
Key information can be supplied for installations that have no DataCenter through the use of conventional size instruments. Honeywell has available a complete line of such instruments which can be made a part of any installation. Examples of instrumentation for three important variables follow.



Water flow—Condenser water flow for checking cooling tower and condenser performance . . . chilled water flow for checking chiller performance. Steam flow for checking boiler performance. Honeywell flowmeters such as this can give an indication of instantaneous flow, a recording of changes in flow or total flow over a considerable period of time.



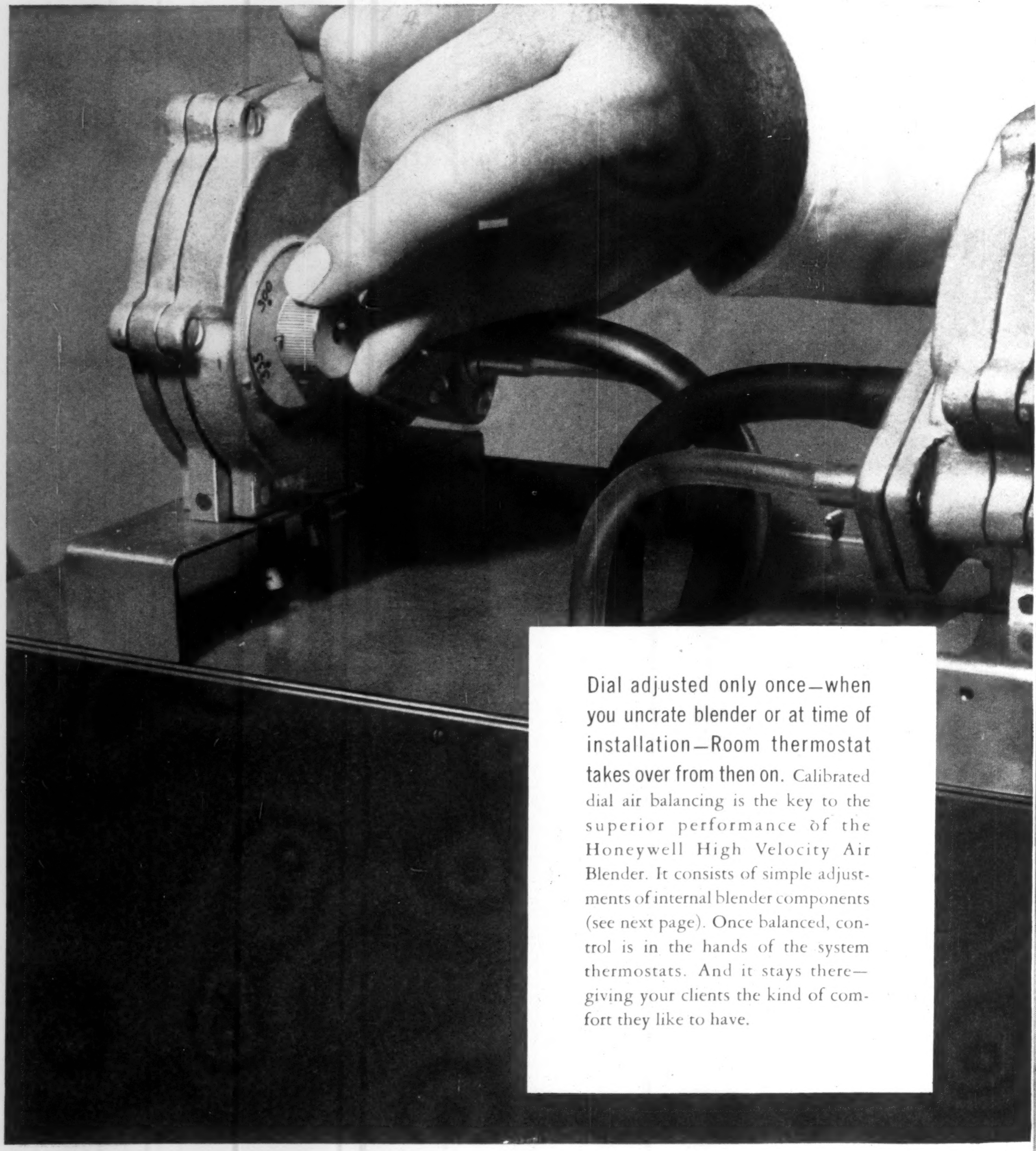
Temperature—Condenser water supply and return temperatures for checking cooling tower and condenser performance . . . chilled water supply and return temperatures for checking chiller performance. These instruments can give an indication of instantaneous temperature or record change. Indicators and recorders are available as controllers.



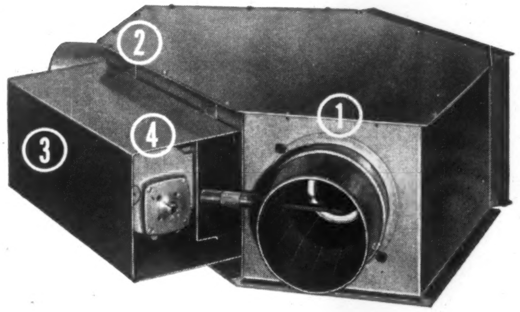
BTU's—This instrument receives signals simultaneously of the temperature difference and the flow and combines them to give the total heat transfer in BTU's. By comparing power input to refrigeration compressors with BTU's consumed, efficiency can be determined and the plant run at optimum. This can save thousands of dollars annually.

For another big, exciting Honeywell development in air conditioning control, turn the page.

Control leadership through advanced engineering-research Solves your dual-duct high velocity distribution problems

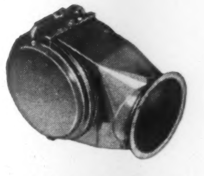


Dial adjusted only once—when you uncrate blender or at time of installation—Room thermostat takes over from then on. Calibrated dial air balancing is the key to the superior performance of the Honeywell High Velocity Air Blender. It consists of simple adjustments of internal blender components (see next page). Once balanced, control is in the hands of the system thermostats. And it stays there—giving your clients the kind of comfort they like to have.

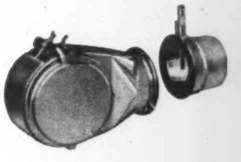


The complete blender

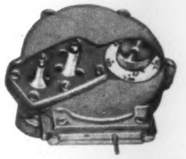
This is how the conventional packaged blender looks. From it you and your clients can expect controlled volume of air, constant CFM, long valve life and simplified control.



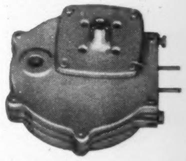
1. Cold Valve—(containing the diaphragm—the only moving part) controls the total air flow from the unit.



2. Hot Valve—like the cold valve, but with a scale on the variable orifice as part of *dial balancing* system.



3. Flow Regulator—with calibrated dial (CFM or inches of water) to preset total flow of the unit.



4. Submaster Regulator—similar to the Flow Regulator. Reacts to signals from room thermostat.

Revolutionary Dial Air Balancing—With New Honeywell Air Blender

Provides constant delivered air volume—one room can't rob air from another

WITH DIAL air balancing the room thermostat is now free to do its job right.

Occupants get the level of comfort they call for. And it doesn't come at the expense of some other room. It comes from the system. *One room no longer "robs" another of comfort.*

Self-powered, the Honeywell Air Blender uses the air pressure of the high velocity air it is controlling to actuate its diaphragm—its only moving part.

For further information about Honeywell High Velocity Air Blenders and other Honeywell heating and air conditioning products, call your local Honeywell office. Or write to Honeywell, Dept. HA-2-46, Minneapolis 8, Minnesota.

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Honeywell

112 offices across the nation

H HONEYWELL

First in heating-cooling controls

Only Honeywell gives you all four—pneumatic, electric, electronic, instruments.

Room thermostat—
*the **Honeywell Round***

The "new" look in thermostats that's appearing on walls of commercial buildings throughout America. New design *inside* gives closer control, vastly superior performance.

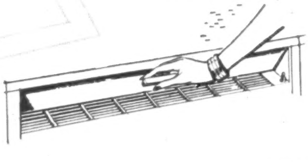
This ad of interest only to those who want the finest in convector radiation

Modine convectors are the choice of top architects and heating engineers when they want superb styling, backed by superb performance. These beautifully designed convectors have met every test for uniform, healthful heating . . . for long-life, economical service.

MODINE CONVECTORS

The Modine representative listed in your classified phone book can offer you a selection of 30 types of Modine convectors in 8000 sizes. Call him today, or write Modine Mfg. Co., 1509 DeKoven Avenue, Racine, Wisconsin.

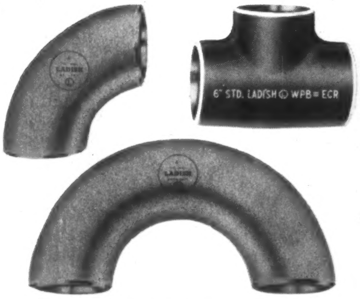
Modine
CONVECTOR RADIATION



Fingertip control of heat delivery — a Modine exclusive.

In Canada: Sarco, Ltd., Toronto

R-1305



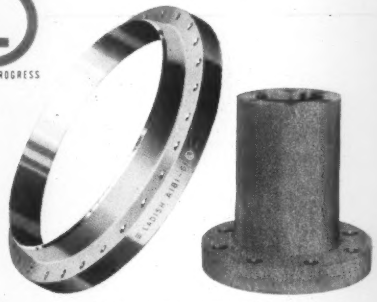
BUTT WELDING FITTINGS (IPS)

ASA and MSS FLANGES

L

TO MARK PROGRESS

BUTT WELDING FITTINGS (TUBE O.D.)



LARGE O.D., TEMA and LONG WELDING NECK FLANGES

UNIONS

SCREWED and SOCKET FITTINGS

LADISH

FOR

Complete Service

IN

Controlled Quality

FITTINGS

CARBON • ALLOY AND STAINLESS STEELS

WHATEVER your fittings requirements . . . regardless of the type, size, wall thickness, pressure rating or material specification . . . you can get prompt, efficient, *complete service* by specifying LADISH and ordering from your local Authorized Ladish Distributor.

A broad, full-range line produced to unsurpassed standards of metallurgical and manufacturing integrity . . . plus adequate local stocks . . . gives you double assurance of satisfaction.

For complete service on your fittings requirements . . . call your Authorized Ladish Distributor.

Catalogs available on request. Please indicate specific product lines for which information is desired.

THE COMPLETE *Controlled Quality* FITTINGS LINE

LADISH CO.

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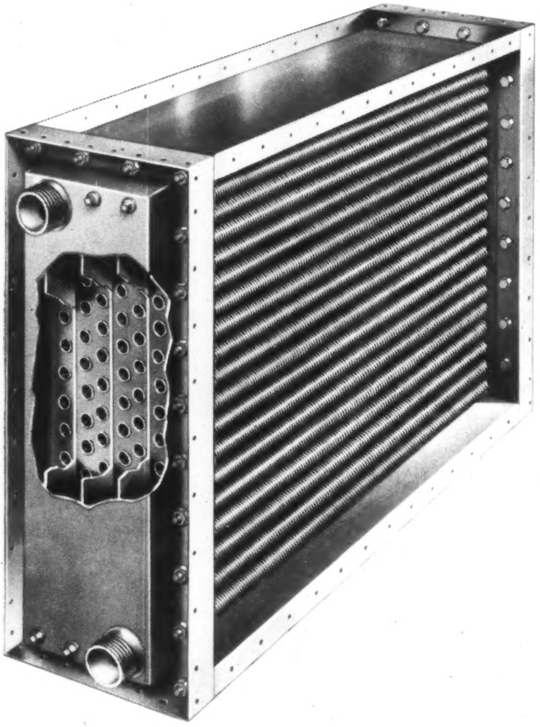


AEROFIN

TYPE R REMOVABLE-HEADER WATER COILS

- ***Complete Drainability***
- ***Easily Cleaned***
- ***High Heat Transfer***

Completely drainable and easily cleaned, Aerofin Type "R" coils are specially designed for installations where frequent mechanical cleaning of the inside of the tubes is required.

The use of ⅝" O. D. tubes permits the coil to drain completely through the water and drain connections and, in installations where sediment is a problem, the coil can be pitched in either direction. The simple removal of a single gasketed plate at each end of the coil exposes every tube, and makes thorough cleaning possible from either end.

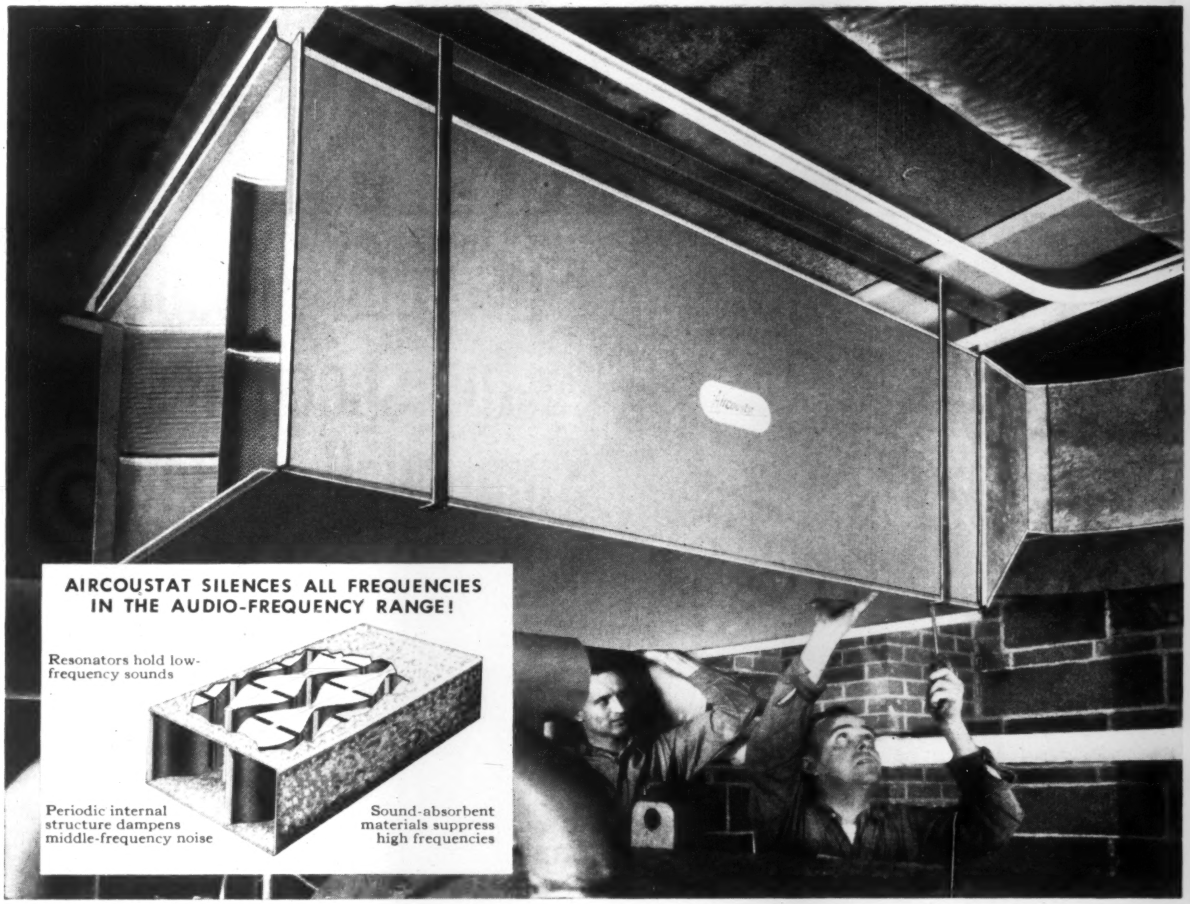
The finned tubes are staggered in the direction of air flow, resulting in maximum heat transfer. Casings are standardized for easy installation.

Write for Bulletin No. R-50.

AEROFIN CORPORATION

101 Greenway Ave., Syracuse 3, N. Y.

Aerofin is sold only by manufacturers of fan system apparatus. List on request.


AIRCOUSTAT SILENCES ALL FREQUENCIES IN THE AUDIO-FREQUENCY RANGE!
Resonators hold low-frequency sounds
Periodic internal structure dampens middle-frequency noise
Sound-absorbent materials suppress high frequencies
Aircoustat

AIRCOUSTAT* Sound Traps eliminate air conditioning noise at 50% less cost

Acoustical Performance Guaranteed. Easy to Install. Pre-Engineered — No Design or Layout Headaches.

Revolutionary AIRCOUSTAT Sound Traps require no special tools for installation . . . reduce your labor costs and lower your installation time. Units fit any size or shape of duct. If AIRCOUSTAT fits *geometrically,* it fits *acoustically*.

AIRCOUSTAT is the most efficient method of sound-deadening you can provide your customers. A 7-foot AIRCOUSTAT unit suppresses as much sound as 100 feet of ordinary duct lining. AIRCOUSTAT eliminates all frequencies in the entire audio-frequency range, silences entire systems or selected outlets. Flow resistance and pressure drop are lower. 4 series cover applications ranging from general offices to recording studios.

Discover how AIRCOUSTAT Sound Traps can save you time and money . . . create greater customer satisfaction.

**Koppers Trade Mark*

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INDUSTRIAL SOUND CONTROL

Engineered* Products Sold with *Service

MAIL THIS COUPON TODAY

KOPPERS COMPANY, INC., Metal Products Div., Industrial Sound Control Dept., 6202 Scott St., Baltimore 3, Md.
Gentlemen: Please send me a free copy of your booklet on AIRCOUSTAT Sound Traps.

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Company..

Address...

City.................................... Zone...... State....................

CRANE

10 good reasons for specifying Sunnywall radiation

for all types of commercial buildings

❶ Interlock supports front at top

❷ Curved louver grille discharges upward and outward

❸ Panel prepunched for fastening to wall

❹ One-piece back panel supports ensemble

❺ Adjustable heating element hanger

❻ Front (16 gauge) completely encloses heating element on three sides

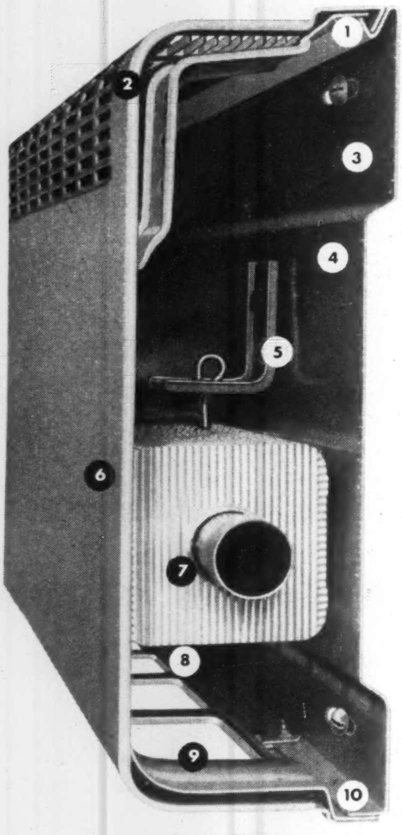
❼ Copper-tube, aluminum fin heating element

❽ Attractive extruded inlet grille

❾ Integral vertical channel braces

❿ Bottom interlock for front support

(Knob-operated damper optional)



Style A Enclosure

Never before has there been a radiation that excels so greatly in *both* strength and appearance!

Enclosure front panels are constructed of heavy (*16 gauge*) furniture steel and are coated with a baked enamel finish (available in six colors!). They are formed in such a manner as to provide exceptional longitudinal strength and vertically braced with two or more die-formed channel supports to form a single rugged unit.

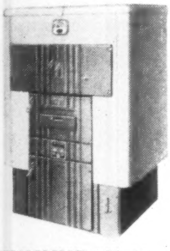
Crane Sunnywall heating elements, too, possess great durability. Their corrugated fins have the strength of flat fins twice the thickness, are more resistant to damage.

The durability of the entire ensemble helps make Crane Sunnywall the ideal radiation for all types of commercial buildings where equipment must be able to withstand long years of hard service.

Crane Sunnywall is suitable for both hot water and steam systems. A full line of accessories and optional equipment makes it tremendously versatile.

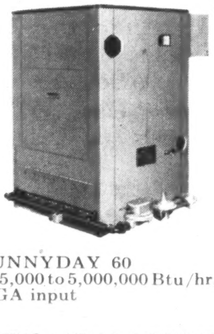
See your Crane Branch or Crane Wholesaler. Get full details on Crane Sunnywall radiation and *all* your commercial heating requirements.

TEAM UP SUNNYWALL WITH THESE HIGH-CAPACITY CRANE SUNNYDAY BOILERS



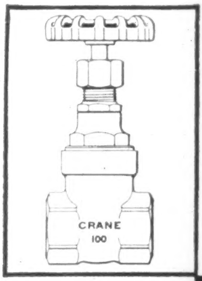
SUNNYDAY 30
268,000 to 1,367,000 Btu/hr. gross IBR output

SUNNYDAY 40
350,000 to 2,380,000 Btu/hr. AGA input



SUNNYDAY 60
625,000 to 5,000,000 Btu/hr. AGA input

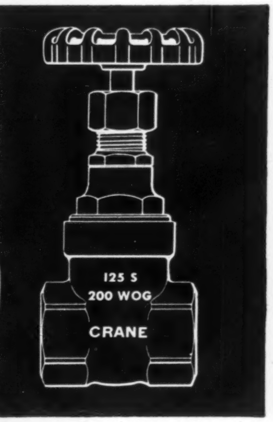
CRANE CO. 836 South Michigan Avenue, Chicago 5 • VALVES • FITTINGS • PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING



No. 410—100-Pound
Sizes to 2 in.

Contractors' Preference for Hot Water Systems

No. 438—125-Pound
Sizes to 3 in.



CRANE

BRASS GATE

VALVES

150 S
300 WOG
CRANE

No. 437—150-Pound
Sizes to 3 in.

100-, 125- and 150-Pound Classes

Non-Rising Stem—Wedge Disc

Here are today's preferred stop valves for hot water systems. They've earned top recognition for dependability, both under frequent operation and after extended idleness.

In each class they pack a lot of added quality at a competitive price.

For example, Crane cylindrical upper body design gives increased strength and rigidity. It's the same design principle as used for high-pressure steel valves. For a firm, safe wrench grip, Crane gives the hex ends wider than usual faces.

These valves have a deep, screwed-into-the-bonnet stuffing box. Its long contact with the stem gives the stem added support and maintains true alignment. This also reduces wear on packing.

Ask for Circular AD-1944

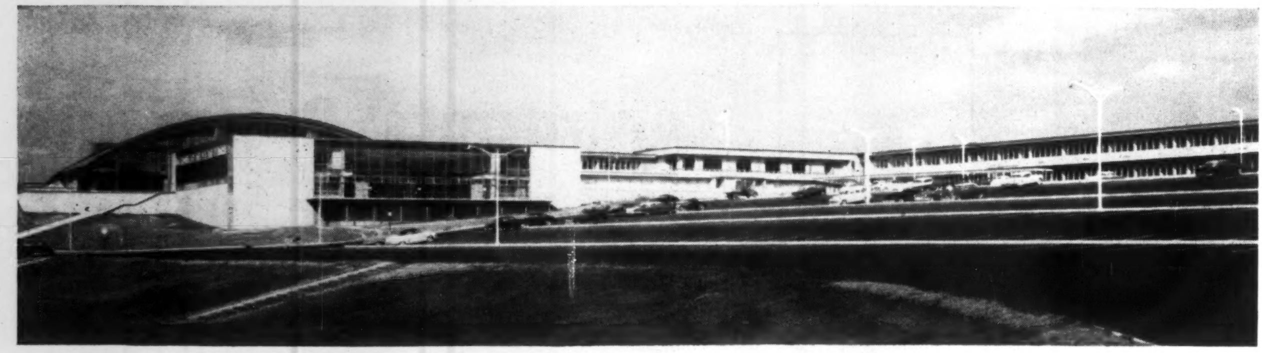
Get full information on these valves from your Crane Representative the next time he calls. Or write to address below for this circular giving all specification data.

NOW
CRANE
Brass Gate Valves

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

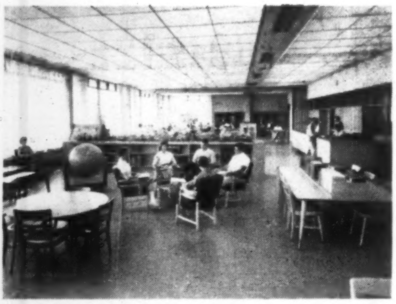
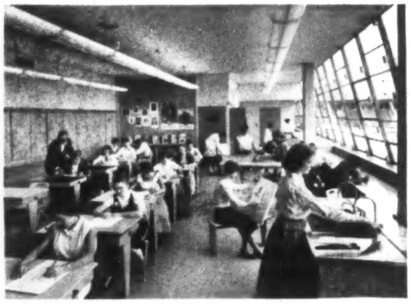
Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

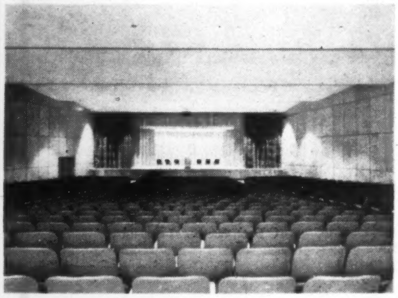


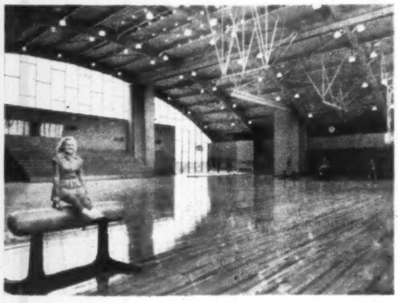
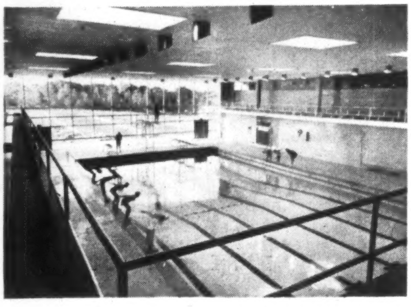
Thermal comfort, convenience, economy in largest

ABINGTON TOWNSHIP SENIOR HIGH SCHOOL, Abington, Pennsylvania . . . is noteworthy for its comprehensive educational program and its complete development of modern facilities for learning.

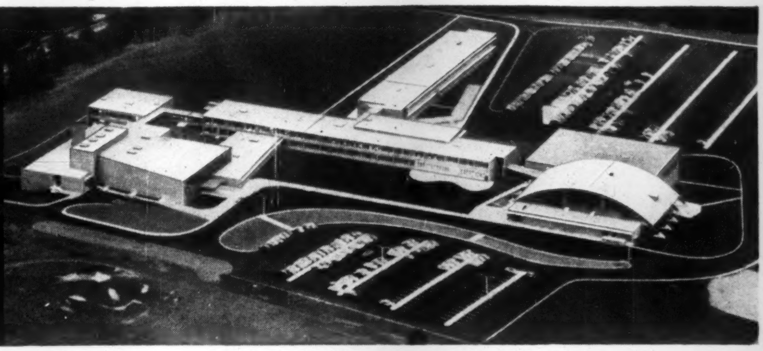
Architect:
Joseph Wigmore, Philadelphia, Pa.
Mechanical Engineer:
Carl D. Shields
General Contractor:
Baton Construction Corporation
Mechanical Contractor:
American Sanitary Sales & Service Co., Inc.



"This school has been built by the careful work of many hands, the deep loves of many hearts, the clear lights of many minds. We pray that it may be forever free to hand down to our children the heritage of truth, justice and liberty under God which we have treasured from our forefathers."



high school in suburban Philadelphia, are assured

by a POWERS THERMOSTATIC control system

POWERS Individual Room Control regulates heating and ventilating in the buildings shown above which have over 250,000 sq. ft. of floor space.

Control of the steam heating system is divided into 16 functional zones, each with its own DAY-NITE-quick warm up selector switch. Static pressure control of air in main auditorium and stage area prevents stage curtain from blowing. Controls in main auditorium and Audion also provide for future air conditioning. Other types of Powers control regulate steam pressure of oil fired boilers, temperature of feed water heaters, fuel oil preheaters, domestic water heaters and swimming pool heater.

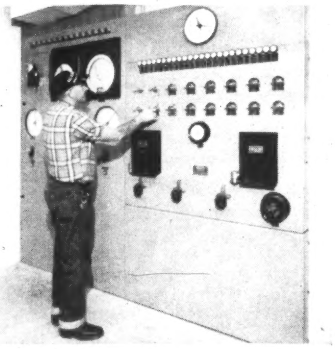
Abington's new $6,000,000 high school has been designed to provide the most effective environment for stimulating learning and all around growth of students and adults of the community.

In each of 150 classrooms and special service rooms, heating and ventilating are controlled by a Powers individual room thermostat. Ideal room temperatures help students to think better and increase efficiency of teachers. By eliminating over-heated rooms Powers control also reduces heating costs.

Powers Control Systems are engineered to give lowest operating and maintenance cost service. Users often report 25 to 40 years of dependable control with a minimum of repairs.

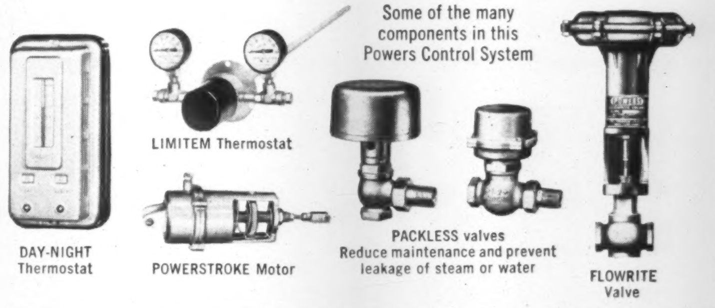
Are You Planning a New Building or remodeling an old one? Ask your architect to include a Powers quality system of temperature control. You will help insure utmost comfort, fuel economy and lowest operating and upkeep cost.

(C82)



Powers Master Control Panel in engineer's office provides centralized supervision for the 16 zones throughout the school plant. When gymnasium or swimming pool are in use, heating and ventilating in locker spaces automatically go into operation. Special Powers humidity control prevents "fogging" of large glass window in swimming pool.

Some of the many components in this Powers Control System



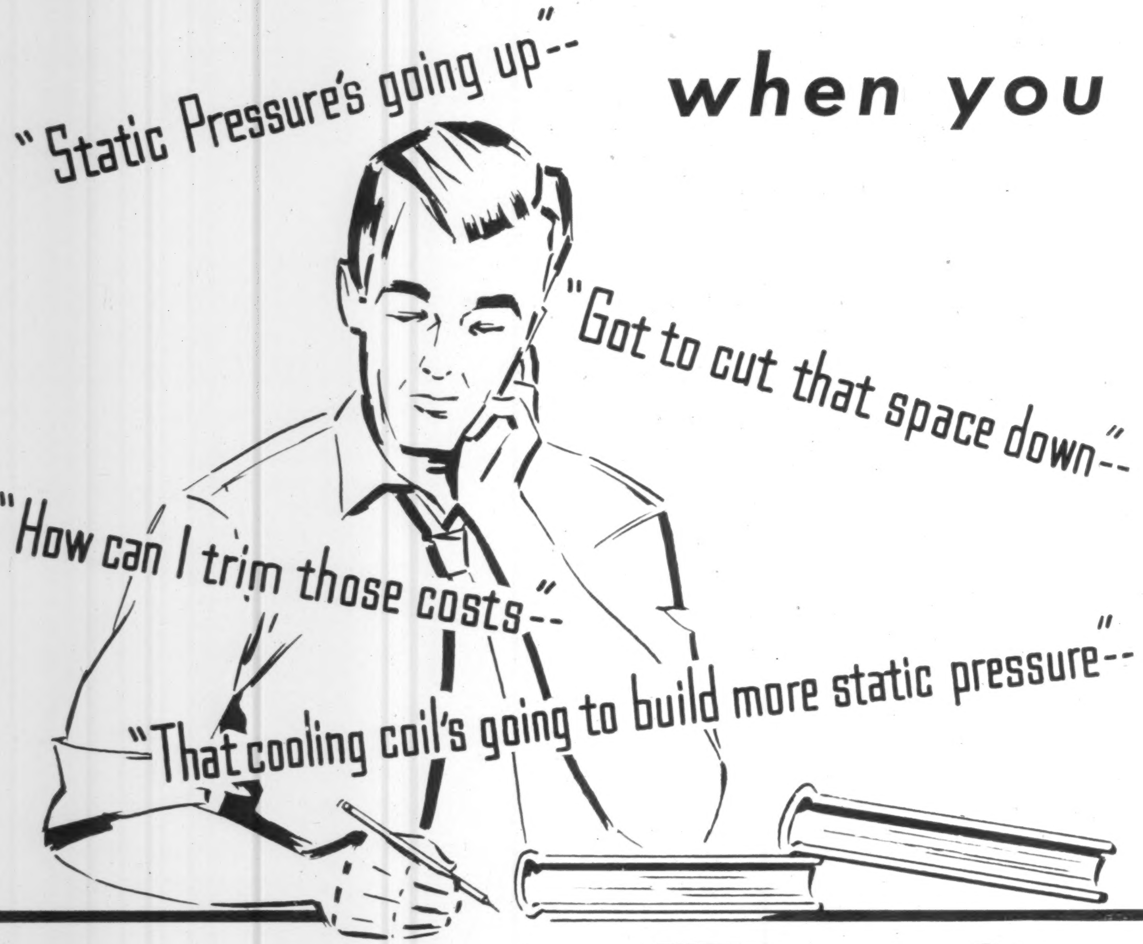
For further information contact our nearest office

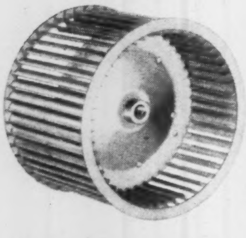
THE POWERS REGULATOR COMPANY

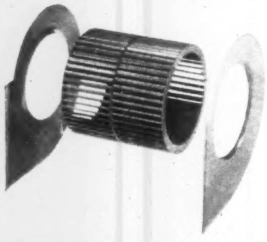
SKOKIE, ILLINOIS | *Offices in chief cities in U.S.A., Canada and Mexico*

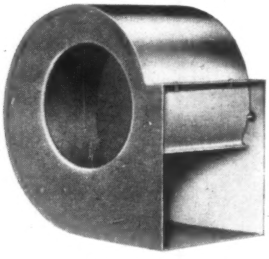
65 YEARS OF AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL

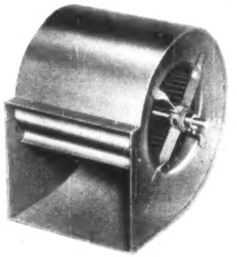
when you


"Static Pressure's going up"--
"Got to cut that space down"--
"How can I trim those costs"--
"That cooling coil's going to build more static pressure"--

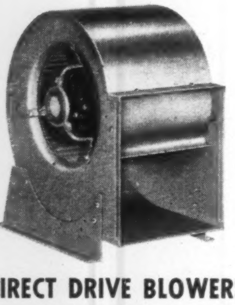

BLOWER WHEELS

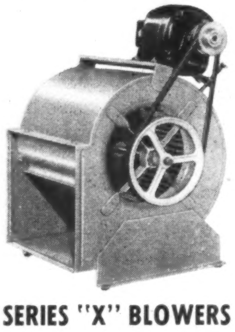

WHEELS AND SIDE PLATES

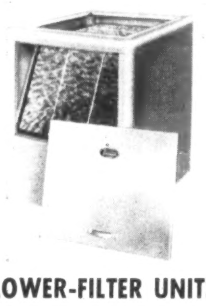

BLOWER HOUSING


BASIC BLOWERS

POWER CENTER BLOWERS


DIRECT DRIVE BLOWERS


SERIES "X" BLOWERS


BLOWER-FILTER UNITS

The name for quality and service since 1919

face these problems

A *Smaller*

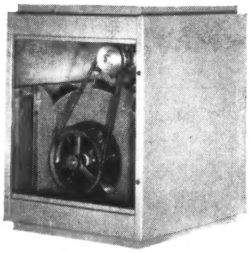
(instead of a larger*)

BRUNDAGE BLOWER

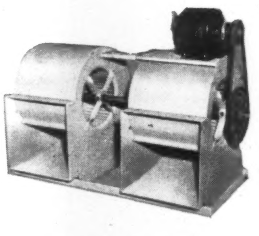
may be your answer

---

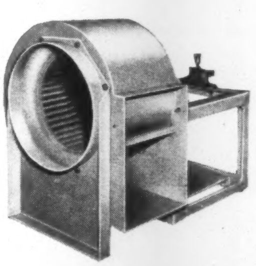
* *See how this can work for you at the International Heating and Air Conditioning Exposition . . .* BOOTH 615



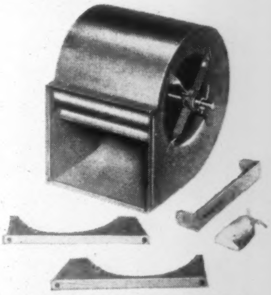
DUCT BLOWERS



TWIN BLOWERS



BLOWER-EXHAUSTERS

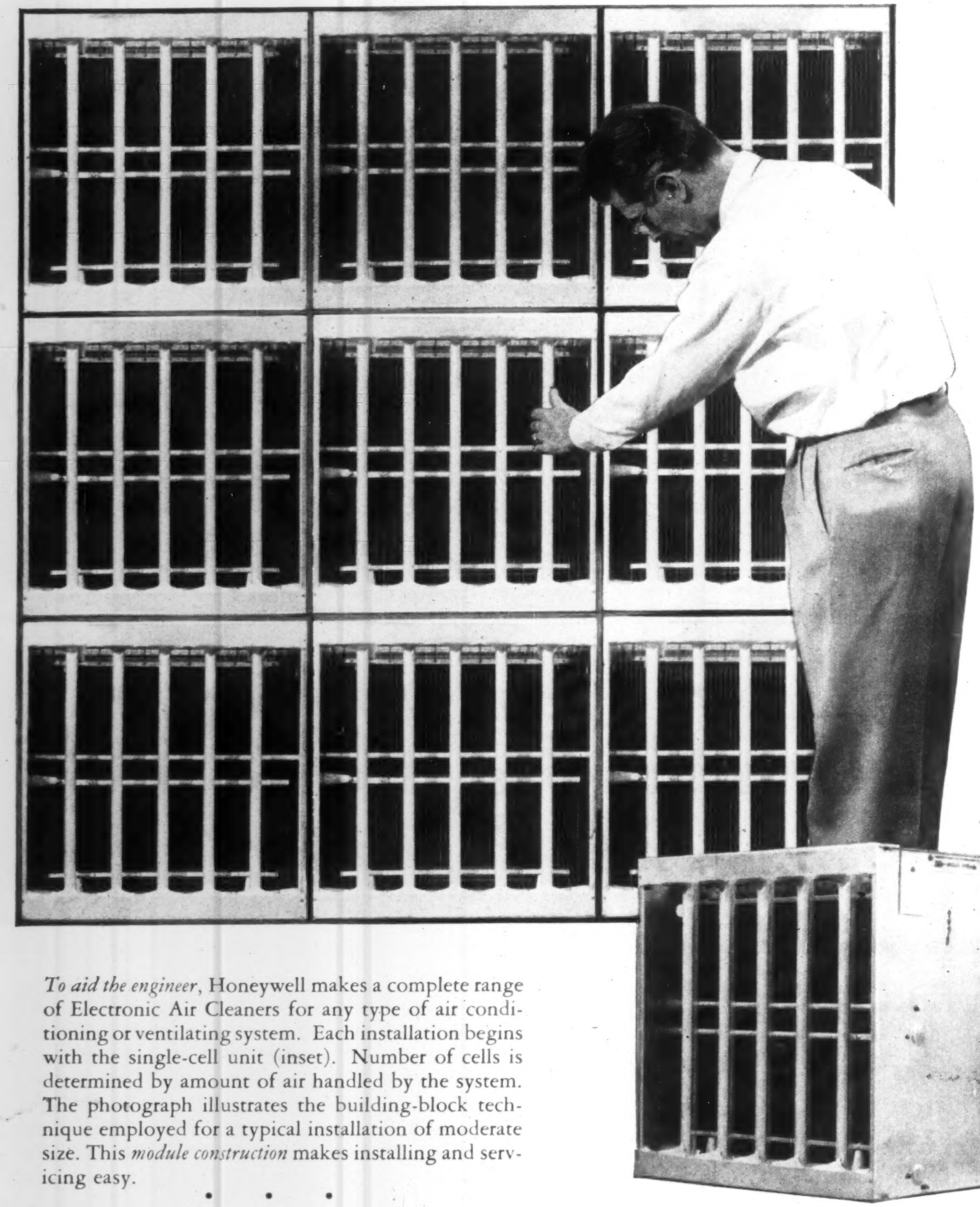


UNIVERSAL BLOWERS

BRUNDAGE

THE BRUNDAGE COMPANY
Kalamazoo, Michigan
Phone Fireside 2-0251

Now! HONEYWELL makes an



To aid the engineer, Honeywell makes a complete range of Electronic Air Cleaners for any type of air conditioning or ventilating system. Each installation begins with the single-cell unit (inset). Number of cells is determined by amount of air handled by the system. The photograph illustrates the building-block technique employed for a typical installation of moderate size. This *module construction* makes installing and servicing easy.

• • •

See the Honeywell Electronic Air Cleaner on display at the 13th International Heating and Air Conditioning Exposition (ASHAE)—Booth 917, International Amphitheatre, Chicago, starting February 25.

ELECTRONIC AIR CLEANER

From the leader in automatic controls for air conditioning comes another progressive step toward ideal control of indoor climate

The electronic Air Cleaner is the most recent addition to Honeywell's world-famous line of products for the control of indoor comfort.

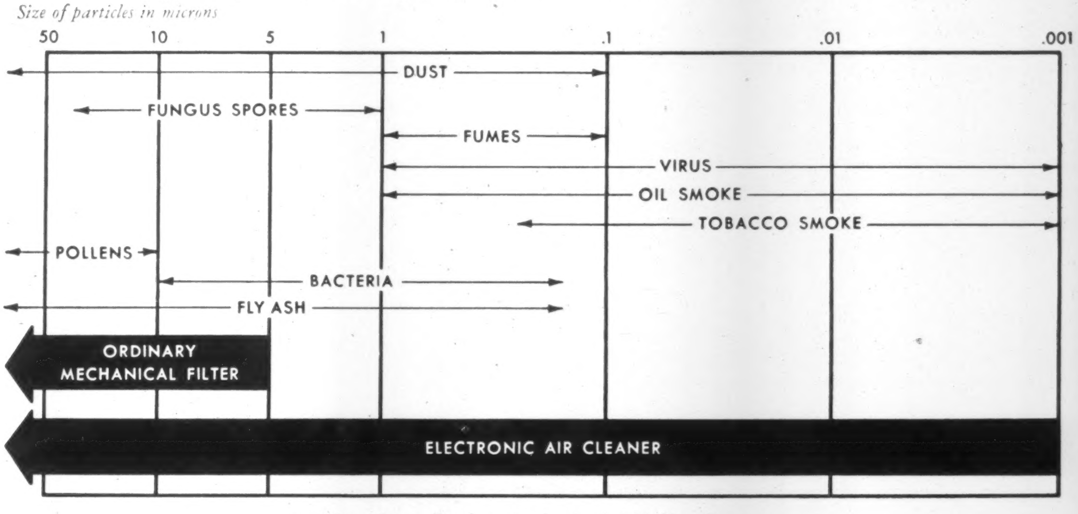
With its introduction, Honeywell's reputation for quality and dependability becomes identified with the most efficient method commercially available for ridding the air of undesirable foreign particles.

This means that now you can confidently assure your clients freedom from the costly scourge of air-borne dirt—freedom that ordinary impingement-type filters can never provide. The superiority of electronic air cleaning is described graphically below, suggesting that a Honeywell Electronic Air Cleaner installation begins to amortize itself immediately.

And of course, because this is a Honeywell product, you can expect and get nation-wide service from reliable field engineers who talk your language.

For complete information on the Honeywell Electronic Air Cleaner, call your local Honeywell office. Or write to Dept. AC-2-54, Minneapolis 8, Minn.

Efficiency Comparison of Electronic Air Cleaner and Mechanical Filter



Note: Particles smaller than 10 microns are invisible to human eye

As shown above, common air-borne contaminants range in size from beyond 50 to .001 microns. In this area lie dust, pollens, fungus spores, bacteria, fly ash, fumes, oil smoke, virus and tobacco smoke. It should be noted that the ordinary mechanical filter removes very few of the air-borne particles of less than 5 microns in size. But notice the wide range of protection offered by the Honeywell Electronic Air Cleaner. Here you get not only the removal of the large coarse particles, but the microscopic ones, as well—a major cause of soiling and many respiratory ills.

MINNEAPOLIS Honeywell

112 offices across the nation

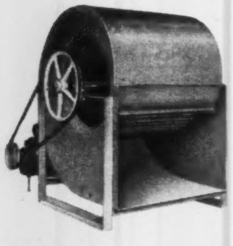
MAKE

BARRY

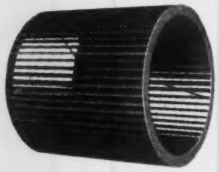
BLOWER COMPANY

your dependable low cost source of supply for

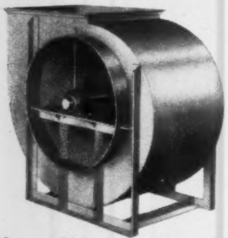
Power Fan Equipment



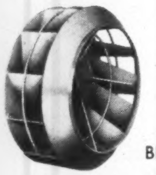
BFC, DI-DW Blower.



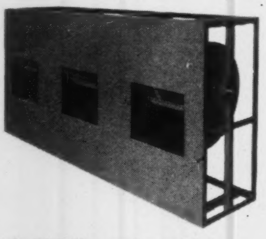
BFC, DI-DW Wheel.



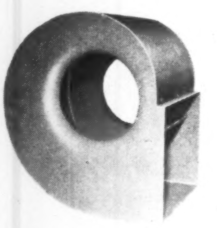
BBI Blower, SI-SW, Arrangement No. 3 Class 4.



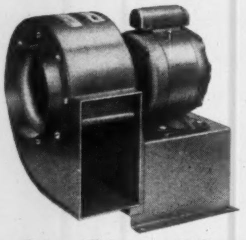
BBI Blower Wheel, SI-SW. Class 2.



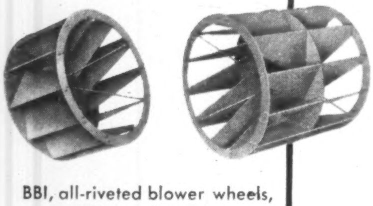
Triple BFC Blower Assembly.



BFC, DI-DW Housing.



Direct Drive, All-Purpose Utility Blower



BBI, all-riveted blower wheels, SI-SW and DI-DW.

We offer users of power fan equipment a full line of blowers, multiple blower assemblies, direct and belt driven ventilating sets, cast iron blowers and various types of centrifugal blower wheels and housings. All sizes from 6″ to 73″.

All BARRY blower wheels and housings are precision made from steel, aluminum, brass, copper, or stainless, and are expertly balanced and trued before shipment.

We make power fan equipment *exclusively* and do not compete with our own customers . . . and, we have a high reputation for dependable quality and remarkably fast delivery. Let us quote on our standard equipment, or upon your special sizes and specifications. Write today.

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Booths 661-663
IHAC Exposition
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★ A few territories are available for qualified sales representatives.

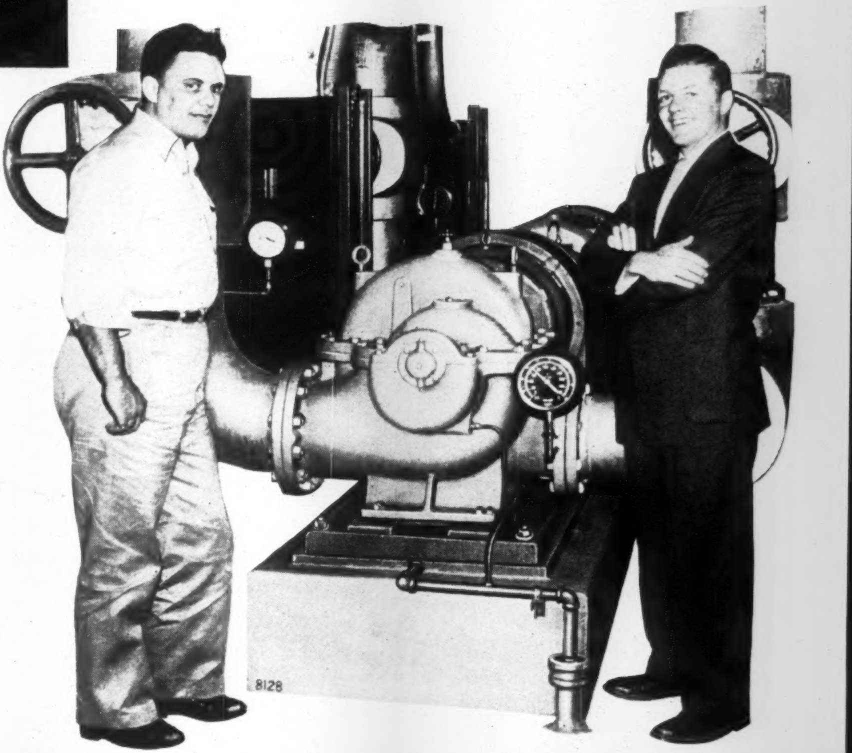
BARRY BLOWER COMPANY

3100 California Street, N. E. • Minneapolis 18, Minnesota

DE LAVAL

CENTRIFUGAL PUMPS

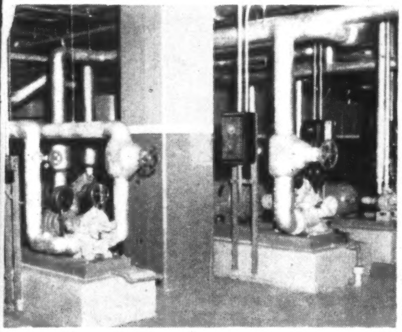
selected by contractor for "long service at low cost"



Ten De Laval centrifugal pumps were installed in the new Shell Oil Building, New Orleans, La. by Emile M. Babst Company, the Mechanical Contractor. "De Laval pumps were selected," Babst reports, "because we know that we can count on their dependability. They are built to give long service at low cost."

De Laval single stage centrifugal pumps are being used for a wide variety of applications in commercial and industrial buildings. For complete data on these units, write for Bulletin 1002.

Shown are Edmund Dolese, Chief Building Engineer (at left) and Robert Ralston of the Emile M. Babst Company, Mechanical Contractor (at right). Architects—August Perez & Associates, Consulting Engineers—Leo S. Weil & Walter B. Moses, General Contractor—Gervais F. Favrot Co., Inc.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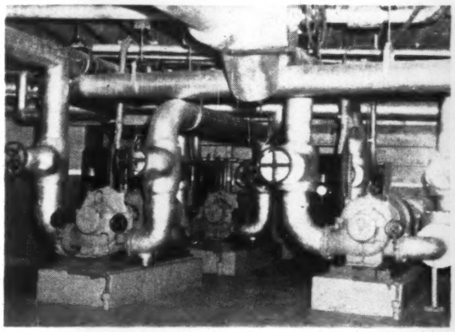
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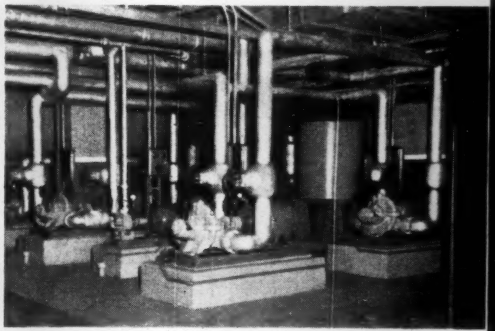

C

The new 14-floor Shell Oil Building in New Orleans has 300,000 sq. ft. of rental area, which is occupied by 45 tenants.

A Two De Laval GS pumps are used for hot water circulating. They operate at 75 gpm and 30 ft. head.

B Four De Laval K pumps are used for coil water service (1800 gpm and 168 ft. head) and condenser water service (2480 gpm and 130 ft. head).

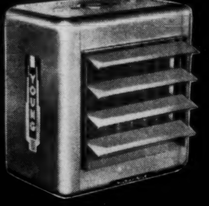
C Four De Laval I pumps are used for cooling tower make-up (115 gpm and 145 ft. head) and house pump service (270 gpm and 174 ft. head).

DE LAVAL *Centrifugal Pumps*

DE LAVAL STEAM TURBINE COMPANY

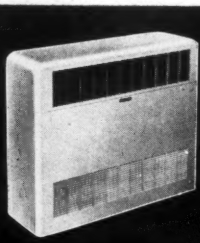
871 Nottingham Way, Trenton 2, New Jersey

L-361

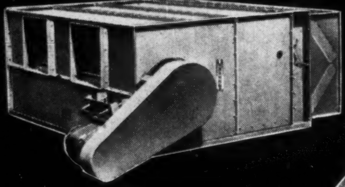


Horizontal Discharge Unit Heaters

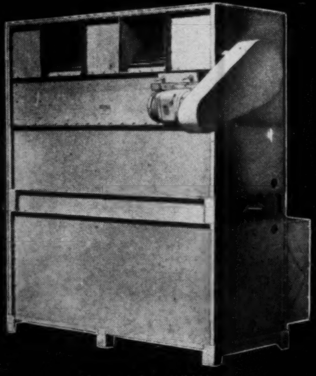
Vertical Discharge Unit Heaters



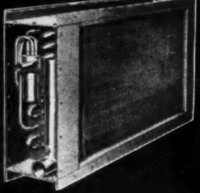
Cabinet Type Unit Heaters



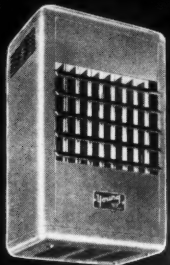
Horizontal Type "YAC" Air Conditioning Units



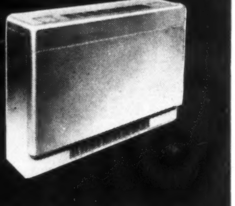
Vertical Type "YAC" Air Conditioning Units



Heating and Cooling Units



Horizontal Discharge Gas-Fired Unit Heaters



Remote Type Roomaire® Conditioners

Perimaheat® Baseboard Convector-Radiators

Standard free-standing, wall-hung, semi-recessed and full-recessed Convector-Radiators

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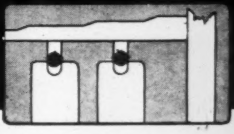
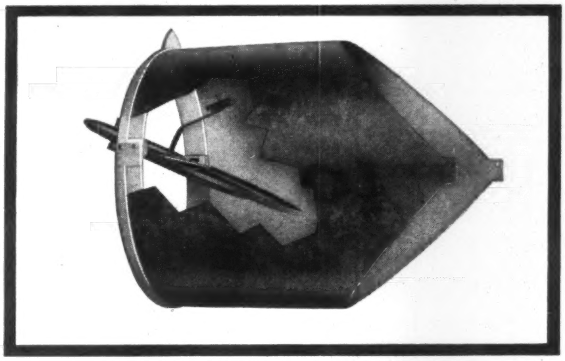
WALKER DOUBLE SWING CONTROL

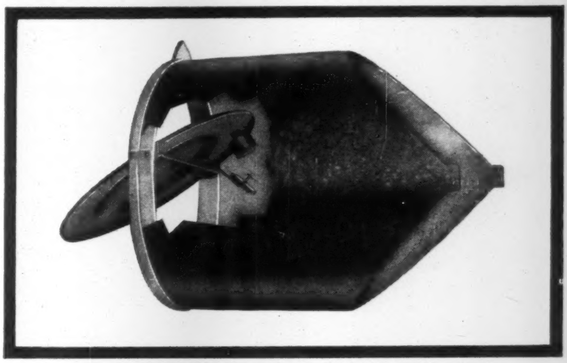
to Regulate UPDRAFT, Dissipate DOWNDRAFT in gas-fired combustion equipment!





UPDRAFT VIEW OF WALKER BBG

This illustration shows how the Double Swing Vane opens INWARDLY for NORMAL UPDRAFT operation. The adjustment weight assembly, delicately designed for high sensitivity, operates by smooth pivot action, maintaining precise draft regulation under all stack draft variations. Automatic fluctuation of this vane keeps draft constantly uniform for top combustion efficiency.



DOWNDRAFT VIEW OF WALKER BBG

Vane here is shown swung OUTWARDLY for DOWNDRAFT relief. When downdraft occurs, the vane swings to the vertical or closed position. Weight of the adjustment assembly is automatically transferred to the relief bar and damper comes into perfect balance. Internal pressure in the breeching causes the vane to swing out, dissipating backdraft pressure before it can affect burner operation.

Unique New Walker Double Swing Control Delivers Two-way Performance for Better Efficiency, Greater Safety!

By preventing excessive draft and at the same time guarding against backdraft, the Walker Double Swing Control both increases efficiency and adds to the safe operation of gas-fired combustion equipment. Approved by Underwriters Laboratories, the Model BBG is another example of Walker's progressive design and superior engineering.

The unique relief bar arrangement that relieves the weight of the adjustment assembly under downdraft is responsible for the flawless performance of this outstanding control. Perfect balance is built in and adjusted at the factory for utmost sensitivity. Stainless steel knife-edge bearings, incorporated into the inner side of the sturdy frame, hold the vane rigidly centered to prevent scraping or sticking. All parts are stainless steel or cadmium-plated to resist corrosion—and a long, heavy gauge collar holds the draft control safely out of the flue gas stream for prolonged life of all parts.

OPTIONAL EQUIPMENT — SAFETY SWITCH AND RELAY

Prolonged downdraft can cause a dangerous concentration of combustion products in the boiler room. That's why Walker offers this optional safety equipment which flashes a red warning light when hazardous conditions occur. If downdraft continues to persist, relay cuts off the burner. This extra safety feature is well worth its modest additional cost.

Look to Walker
FOR A COMPLETE LINE OF DRAFT CONTROL PRODUCTS

Walker, with over 30 years of draft control experience, produces automatic regulators for a complete range of installations . . . from small space heaters to the largest heating plants in factories and multiple housing projects. For complete information on any of the complete line of Walker products, see your supplier or write directly to the factory.

Walker SHUR-FLO Draft Inducer-Regulator
New! Both inspirates and regulates. Corrects any difficulty caused by insufficient draft!

Walker BB
For all commercial and industrial applications.

Walker Royal Purple Model
The only automatic draft control that's absolutely impregnable to soot, carbon, corrosion, dust and dirt.

See our Booth No. 920 at the IH & AC Exposition Chicago — February 25 — March 1.

WALKER MANUFACTURING & SALES CORP.

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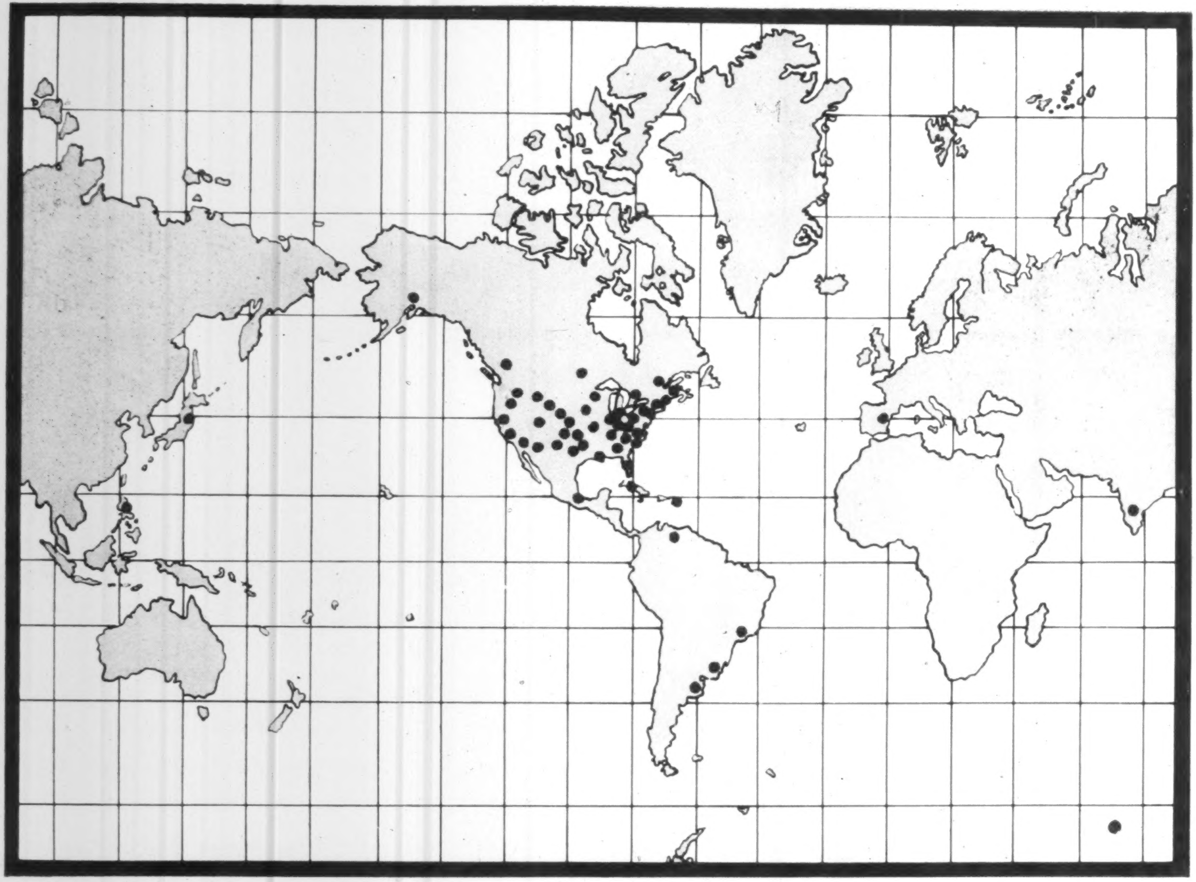

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Service for Prefabricated Piping Systems

Over 75 field offices, both national and international are at your disposal on any project dealing with prefabricated piping systems. These field representatives offer on the spot assistance in planning, delivering and installing underground or overhead piping. A Ric-wiL representative will be glad to discuss plans involving steam, hot water or oil distribution lines . . . and he represents the world's largest supplier of prefabricated piping systems.

For the name of your nearest representative or the catalog covering the Ric-wiL line, call or write the home office.

Quality Piping Systems . . .
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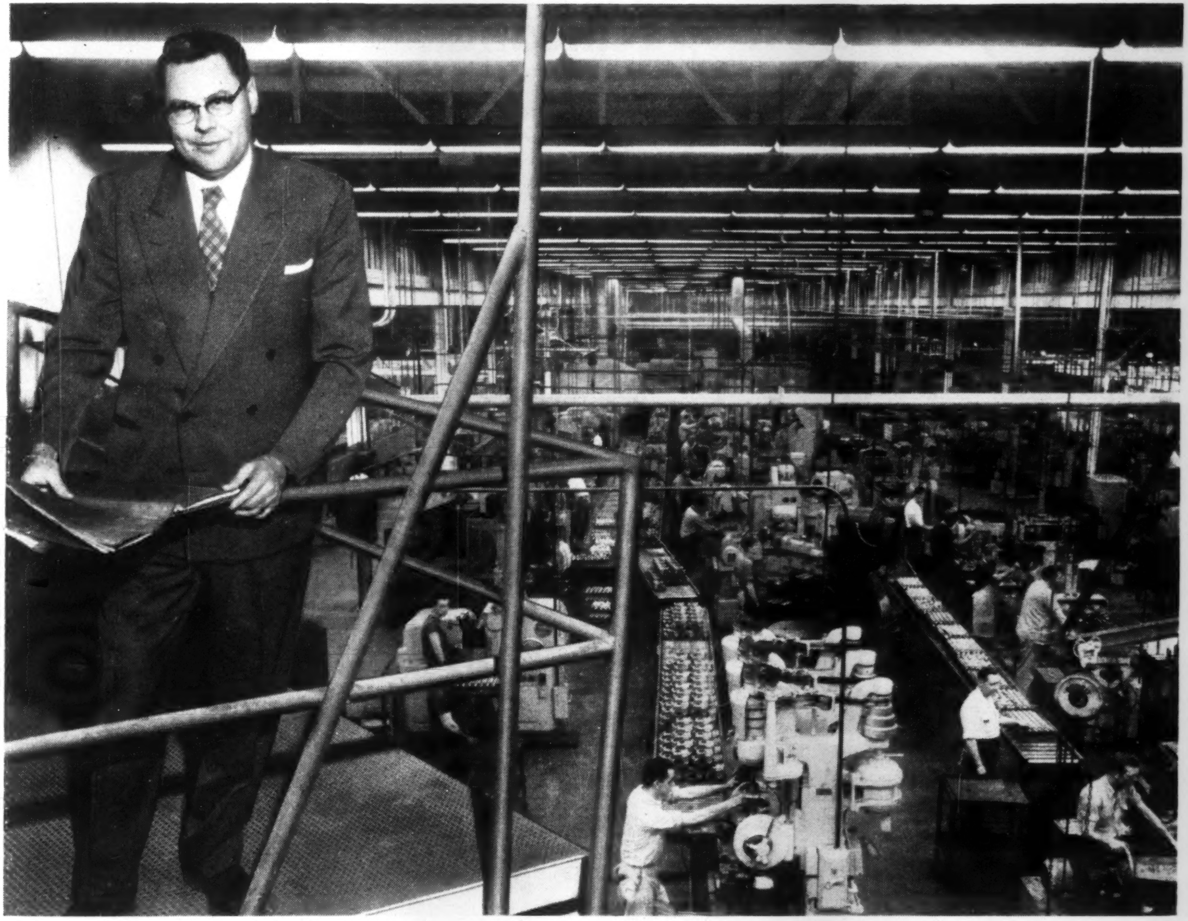

Al Wirick, Manager of Manufacturing

ARE YOUR COMPRESSORS BEING BUILT HERE?

Our compressor manufacturing facilities located here in Evansville, Indiana, are among the best in the world.

To begin with they're big—over 360,000 square feet of floor space. They're modern and house the very latest in machine tool equipment—precision grinders, for example, that grind to tolerances of one-tenth the thickness of a human hair, honing equipment to hone cylinder bores to 1/10,000 of an inch, a hospital-clean assembly room where temperature and humidity are controlled to within plus or minus one degree throughout the year.

But machines and physical plant are only part of the story. Of equal importance is manpower. Our labor force is particularly well staffed with skilled, well-trained people boasting long experience in refrigeration work.

In short, we're organized, staffed and equipped to build compressors that are outstanding for maximum capacity, dependable service, long life . . . and to deliver them on time. Give us your requirements. We will be happy to quote you prices and delivery on hermetic compressors and condensing units ranging in capacity from ¼ to 7½ H. P.

Neither this division nor the parent company—Bendix-Westinghouse Automotive Air Brake Company, Elyria, Ohio—has any connection with appliance manufacturing. Bendix-Westinghouse is a joint subsidiary of Bendix Aviation Corporation, Detroit, Michigan, and Westinghouse Air Brake Company, Wilmerding, Pennsylvania. EVANSVILLE DIVISION, EVANSVILLE 11, INDIANA.

SEE OUR EXHIBIT: Booth N301, International Heating and Air Conditioning Exposition, Chicago.
February 25 — March 1

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Write your own specifications:

VOLATILITY
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SIZE
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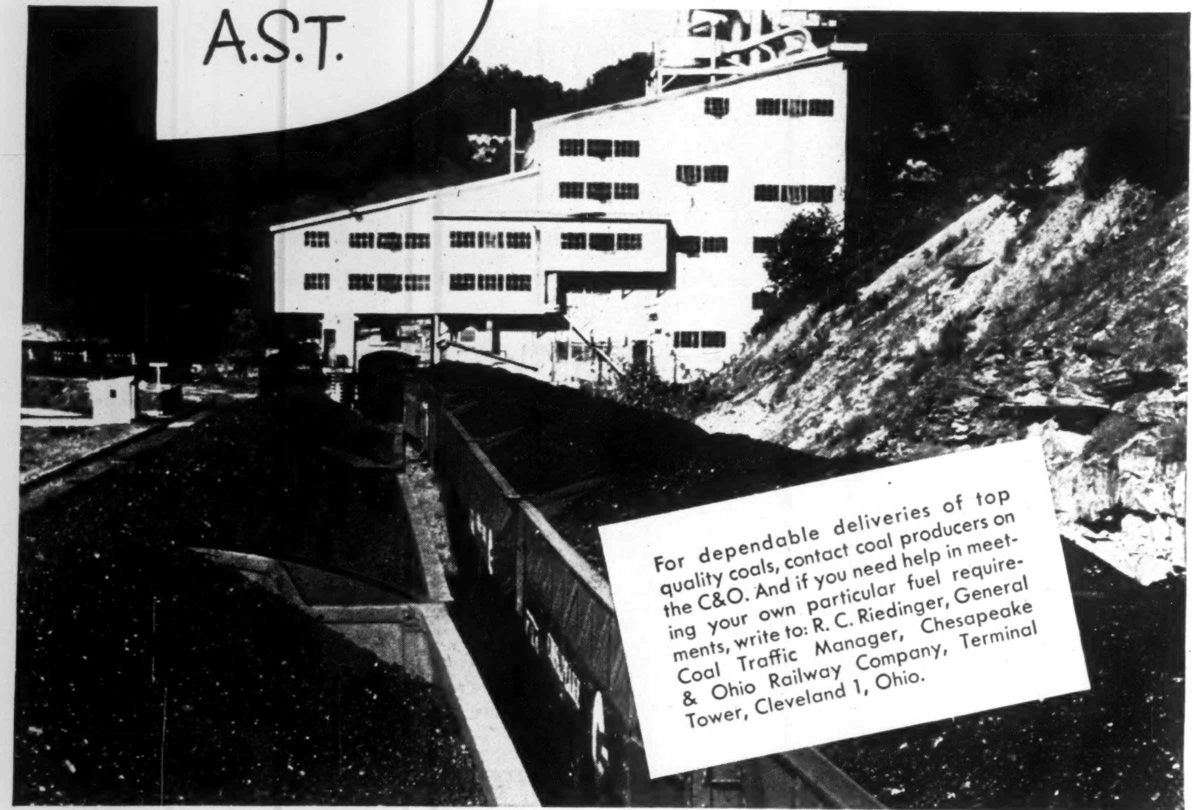
MOISTURE
SULPHUR
A.S.T.

. . . the modern, efficient mines on the C&O can produce just what you want.



For dependable deliveries of top quality coals, contact coal producers on the C&O. And if you need help in meeting your own particular fuel requirements, write to: R. C. Riedinger, General Coal Traffic Manager, Chesapeake & Ohio Railway Company, Terminal Tower, Cleveland 1, Ohio.

Chesapeake and Ohio Railway

WORLD'S LARGEST CARRIER OF BITUMINOUS COAL

Monarch

SPRAY NOZZLES

for AIR WASHERS . . . COOLING TOWERS

These are "non-clogging" nozzles with a single large tangential lead hole to the swirl chamber that will never clog from any impurities small enough to pass through the orifice. Swirl chamber is conical on both ends and pivots liquid like a top to produce an exceptionally fine, evenly distributed, balanced spray of about 80° included angle. Wider spray angles up to 130° can be furnished to order.

Standard material Brass. Also available in Stainless Steel and Monel. Pipe sizes from ⅛" to 1". ¼" size is 1-5/16" long and made from ⅝" square stock.

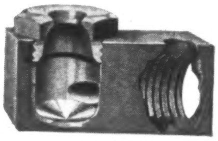


Fig. 631

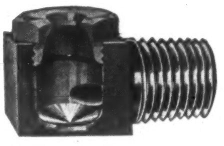


Fig. 629

CAPACITIES: GALLONS PER HOUR

Pipe Size and Fig. No.	Orifice	Lead	OPERATING PRESSURE: LBS. PER SQUARE INCH							
			5	10	20	30	40	60	80	100
⅛" Fig. 629	69	69			2.7	3.3	3.8	4.7	5.4	6.0
	61	61			4.2	5.1	5.9	7.2	8.3	9.2
	61	53	2.7	3.7	5.3	6.5	7.5	9.2	10.5	11.8
	53	53	4.0	5.7	8.2	10.0	11.5	14.1	16.3	18.2
	49	49	5.6	7.9	11.1	13.6	15.7	19.3	22.2	24.8
¼" Fig. 629 or Fig. 631	3/32	3/32	9.6	13.5	19.2	23.4	27.0	33.0	38.4	42.9
	⅛	3/32	12.2	17.3	24.4	29.9	34.6	42.4	49.0	54.9
	⅛	7/64	14.6	20.6	29.1	35.7	41.0	50.4	58.4	65.1
	⅛	⅛	15.9	22.5	31.9	39.2	45.1	55.2	63.7	71.5
	11/64	⅛	21.7	30.6	43.2	53.0	61.1	75.0	86.4	98.0
¼" Fig. 629 or Fig. 631	3/16	5/32	30.5	43.2	61.1	74.9	86.4	107	122	136
	7/32	3/16	45.1	63.8	90.5	110	128	156	180	202
	13/64	13/64	54.7	77.8	108	134	155	191	217	246
	7/32	7/32	59.8	84.5	120	146	169	207	240	267

HUMIDIFIERS . . . . . . AIR CONDITIONERS

The H-261 and F-80 brass nozzles produce the finest, softest, fog-like spray possible with low direct pressure only. Popular sizes are nozzle #3.00 and #5.00 tested either 80° or 120° at 25 pounds.

All Brass construction with 120 mesh Monel screen strainers and ⅛" or ¼" female or ¼" male pipe connection in the F-80 and ¼" male only in the H-261. The H-261 is 1⅜" overall and the F-80, 1⅞".

Fig. H-261

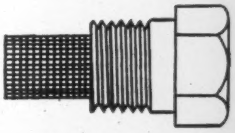
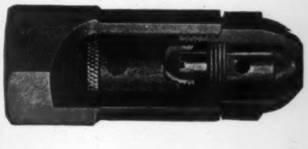


Fig. F-80 Brass



CAPACITIES: GALLONS PER HOUR

Nozzle No.	OPERATING PRESSURE: LBS. PER SQUARE INCH							
	10	25	30	35	40	60	80	100
1.35					* .57	.70	.81	.90
1.65					* .75	.92	1.06	1.18
2.00				* .87	.94	1.14	1.32	1.49
2.50			* .98	1.01	1.13	1.39	1.60	1.80
3.00		1.00	1.10	1.18	1.27	1.55	1.79	2.00
3.50		1.30	1.41	1.54	1.64	2.01	2.32	2.60
4.00		1.50	1.64	1.78	1.90	2.33	2.69	3.00
4.50		1.90	2.09	2.25	2.40	2.94	3.40	3.80
5.00		2.20	2.41	2.60	2.78	3.41	3.94	4.40
5.50		2.40	2.63	2.84	3.04	3.72	4.30	4.80
6.00		2.60	2.85	3.08	3.28	4.03	4.66	5.30
7.00		3.00	3.30	3.55	3.80	4.65	5.37	6.00
7.50	2.02	3.20	3.50	3.78	4.05	4.96	5.74	6.40
8.30	2.27	3.60	3.95	4.27	4.55	5.58	6.45	7.20

OIL BURNERS

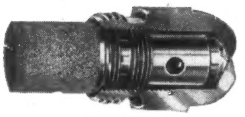


Fig. F-80
Stainless Steel

Monarch Stainless Steel Nozzles for high pressure gun-type oil burners are the Industry yardstick for nozzle performance. Each nozzle individually tested for capacity, spray angle and uniformity of spray on No. 2 fuel oil weighing 7.16 pounds per gallon at 74°F. and 34 S. S. U. viscosity at 100°F. Standard spray angles are 30°, 45°, 60°, 70° and 80° in small sizes.

Standard capacity sizes (GPH at 100 psi.): .60, .75, .85, 1.00, 1.10, 1.20, 1.25, 1.35, 1.50, 1.65, 1.75, 2.00, 2.25, 2.50, 3.00, 3.50, 4.00, 4.50, 5.00, 5.50, 6.00, 6.50, 7.00, 7.50, 8.30, 9.50, 10.50, 12.00, 13.80, 15.30, 17.50, 19.50, 21.50, 24.00, 28.00, 30.00 to 60.0 in 5.00 GPH steps and 60.0 to 100.0 in 10.00 GPH steps.

See us at the HEATING and VENTILATING SHOW — BOOTH No. 1136

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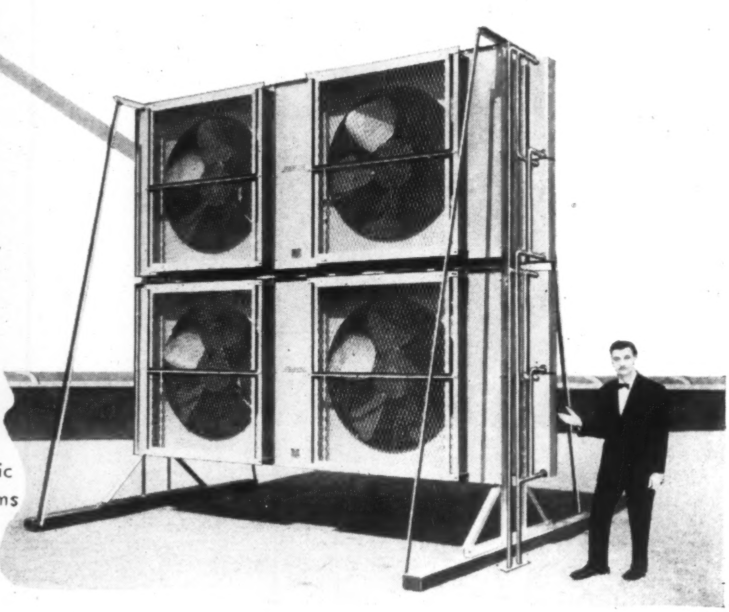
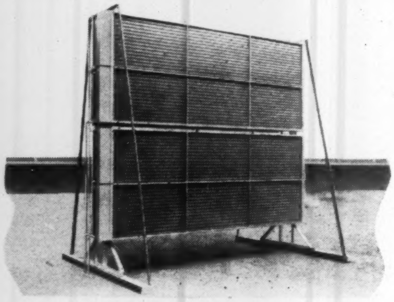
UNICON

GETS BIGGER and BIGGER

There is only one answer to large capacity condenser problems — the KRAMER UNICON. Every day more engineers plan larger tonnage installations — 50, 100 and even — 800 tons. And every day UNICONS are shipped to all parts of the world for giant-sized installations. No other air-cooled condenser can match the long, successful record of UNICON, backed by thousands of applications since 1937 — in the widest range of tonnages and climatic conditions. Your condensing problems can be best answered by use of the best — the KRAMER UNICON.





Space-saver UNICON, *as illustrated*, serves a 60-Ton air conditioning system, yet takes but 70 sq. ft. of roof space.

UNICON is a remote-type air-cooled condenser that requires no water. KRAMER UNICON can be used with any size compressor, REGARDLESS of horsepower. Any size refrigeration or air conditioning system can be air-cooled with UNICON, REGARDLESS of tonnage. UNICON requires less horsepower, less piping, is easier to install and costs less. KRAMER UNICON performs best — even in semi-tropical climates.

WRITE FOR BULLETIN U-210D

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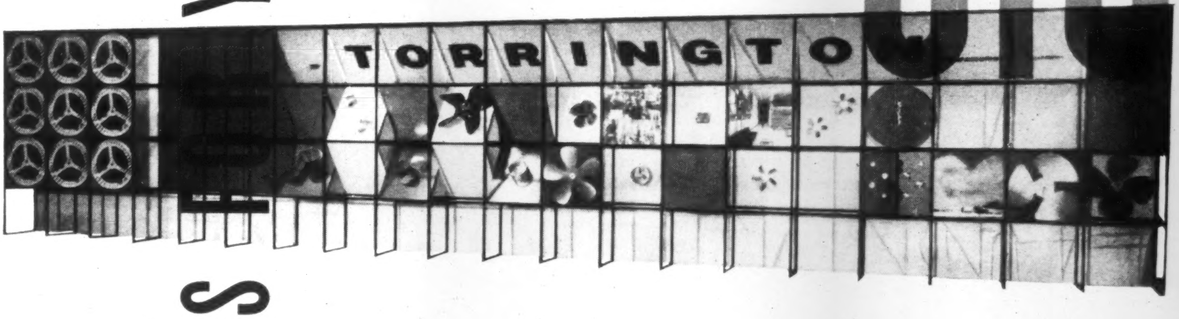
THE NEWS FOR YOU AT 816!

816



That's the number of the Torrington exhibit area at the 13th International Heating and Air Conditioning Exposition.

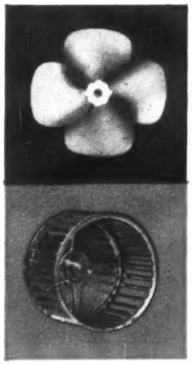
Date: February 23 to March 1.

Place: International Amphitheatre, Chicago, Illinois.

The News: A special display of important new Torrington air impeller products, offering a variety of advanced designs and a wide range of performance ratings to meet *new* problem requirements of the air moving industry.

In the featured spot is the industry's No. 1 development in blower unit design: A full line of the new Torrington Vari-Basic blower units in sizes ranging from 9½" to 12⅝" diameter, in full and three-quarter widths. These units are designed to industry standards; permitting interchangeable flexibility.

Don't miss the *news for you* at No. 816!



THE
TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT
VAN NUYS, CALIFORNIA · OAKVILLE, ONTARIO

YOU CAN HAVE CONFIDENCE IN

HENRY RELIEF VALVES

HENRY
VALVE
CO.
CONTROLLING
FLOW
SINCE 1

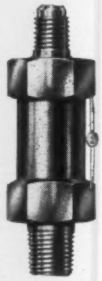
The extra capacity, the extra safety, the assurance of positive protection make Henry the choice of engineers and contractors. All Henry Relief Valves in the sizes and types listed below are constructed in accordance with the standards of the ASME. In addition these valves are stamped NB to indicate National Board Certification as to capacities.

UV ASME NB National Board Certified

FOR FREON AND SIMILAR REFRIGERANTS

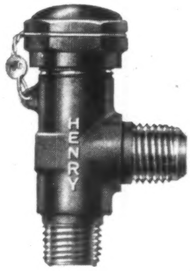
TYPE 523 STRAIGHT-THROUGH RELIEF VALVE

Valve has Henry "Controlled Cushion" cup seat disc construction which prevents deformation of sealing ring and assures consistent operation. This design provides positive relief at predetermined set pressures. Brass construction. Sizes (inlet x outlet) ½" MPT x ⅝" Flare; ½" FPT x ½" FPT; ¾" FPT x ¾" FPT; and 1" FPT x 1" FPT.



TYPE 52 ANGLE RELIEF VALVE

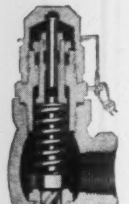
This forged brass relief valve is available in sizes (bottom inlet x side outlet) ¼" MPT x ⅜" Flare; ⅜" MPT x ⅜" Flare; ⅜" MPT x ½" Flare; ½" MPT x ⅝" Flare; and ⅝" ODS x ⅝" ODS.



TYPE 522 ATMOSPHERIC RELIEF VALVE

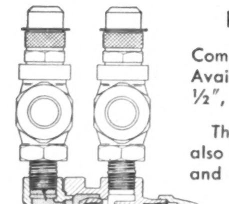
This relief valve of brass construction is for small Freon units and does not have an outlet line connection. Available with ⅛" MPT or ¼" MPT inlet connection.

FOR AMMONIA



ANGLE RELIEF VALVE

Valve has a soft metal alloy seat. Manual reseating stem permits positive emergency reseating without removing the valve from the line. Stainless steel seat insert, seat disc and main guides. Sizes (inlet x outlet) ½" FPT x ¾" FPT; ¾" FPT x 1" FPT; 1" FPT x 1¼" FPT; and 1¼" FPT x 1½" FPT.



PACKAGED DUAL RELIEF VALVE ASSEMBLY

Complies with ASME Code Requirements. Available with F.P.T. inlet connection sizes, ½", ¾" and 1".

Three-way dual shut-off valves are also available separately in various types and sizes for both Ammonia and Freon.

Packaged Assembly Simplifies
Field Installation

Pressure Relief Setting Range of Henry Relief Valves, 50 to 350 PSI

WRITE FOR DATA SHEETS:

AE1303-1
Capacity ratings of Henry Relief Valves
CMC-3
A guide to the selection of Relief Devices in accordance with Chicago Municipal Code
B6-1
Henry Dual Ammonia Relief Valve Assemblies

See your Henry wholesaler for these certified relief valves.

HENRY VALVE COMPANY

Melrose Park, Ill. (Chicago Suburb) · Cable: HEVALCO, Melrose Park, Illinois

SPECIALIZED MANUFACTURERS OF THE COMPLETE LINE OF RELIEF VALVES FOR REFRIGERATION AND AIR CONDITIONING

CEPI EXCLUSIVE MAGNETIC ACTION TAMES UNRULY FLUID—

Means Lower Cost -- More Effective

VERMEIREN PATENTS

SCALE AND CORROSION PREVENTION

In Piping, Boilers and Plant Equipment

Whatever fluid is your problem—CEPI may well be your low-cost permanent answer. Two specific models are made to serve industry . . . The CEPI "W" for water conditioning and the CEPI "A"* for use with sugar juices, pulp liquors, sea water, chemicals, etc.

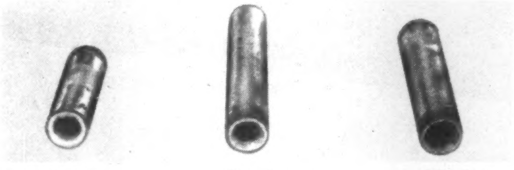
CEPI "W" not only prevents new scale formation, but the treated water coming in contact with existing scale deposits causes their gradual disintegration.

The fool proof working principle of the CEPI unit consists in fluids passing through its highly concentrated magnetic fields. The crystaline structure of scale producing salts are altered and they become essentially amorphous . . . losing the ability to adhere to metals or each other. Piping, boilers and plant equipment remain free of scale and corrosion.

CEPI units are available to handle from 2 to 17,600 gallons of liquid per minute. Installation costs are low. CEPI operation is fully automatic, with no recharging or regenerating ever . . . no additional expenses. For further information and technical data, simply fill out and send coupon below.

CEPI is now being used successfully in industry throughout the world. Installation and industrial application included with your request.

*(Special Technical Data Available)



Installation *30 days* *60 days*

60 day sequence of piping showing diminishing effect of CEPI treated water coming in contact with the existing scale deposits.

Territorial Franchises available. Write for details.

SEND COUPON TODAY FOR TECHNICAL DATA

Without cost or obligation please send complete information of CEPI-AMERICAN fluid conditioning unit.

CEPI "W" — WATER ☐

CEPI "A" — SUGAR JUICES, PULP LIQUORS, SEA WATER ☐

Name____________ Title____________

Company Name____________

Address____________

City____________ Zone____ State______

Cepi-American, Inc. • 7001 North Avenue
Oak Park, Illinois

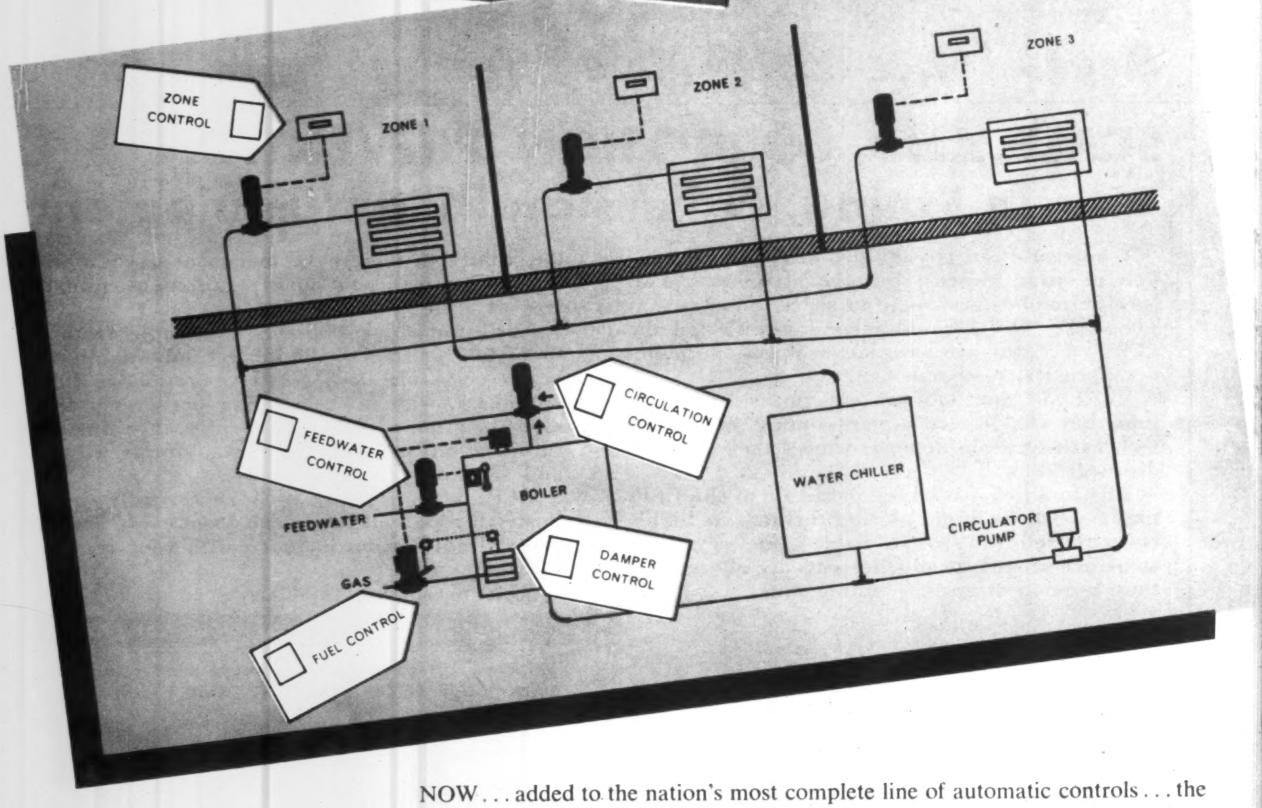
Exhibiting World Fair Brussels 1958

FROM GENERAL CONTROLS—NEW SMALL SIZE

WHERE DO THESE NEW ELECTRIC MOTOR-OPERATED VALVES FIT YOUR SPECIFIC APPLICATIONS?

- ☐ **FUEL CONTROL**—GAS
- ☐ **ZONE CONTROL**—STEAM OR WATER
- ☐ **FEEDWATER CONTROL**
- ☐ **CIRCULATION CONTROL**—WATER/STEAM

H-O SERIES HYDRAMOTOR® VALVES

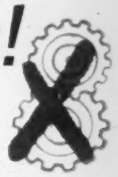

ZONE CONTROL
ZONE 1
ZONE 2
ZONE 3
CIRCULATION CONTROL
FEEDWATER CONTROL
BOILER
WATER CHILLER
FEEDWATER
CIRCULATOR PUMP
DAMPER CONTROL
GAS
FUEL CONTROL

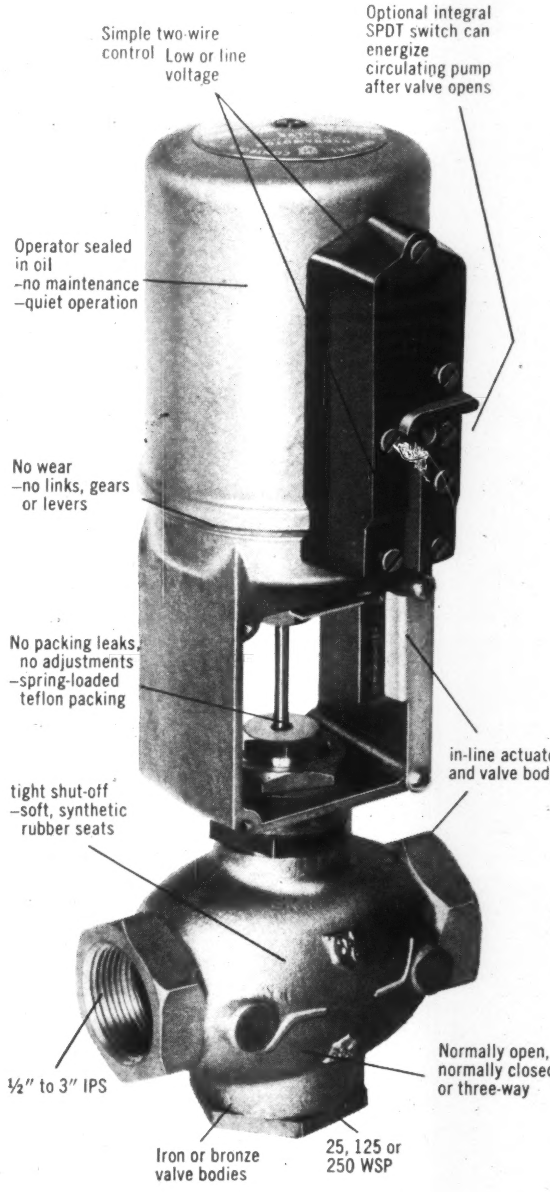
NOW . . . added to the nation's most complete line of automatic controls . . . the new, *all-new* H-O Series Hydramotor Valve. You can use it for *all* applications where small size shut-off or three-way valves are needed. It's another *first* by General Controls!

This new H-O Series by General Controls is a new application of the long-established Hydramotor principle. No gears . . . it's electro-hydraulic!

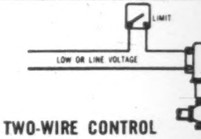
What's more . . . H-O Series Hydramotor Valves are available from standard stock . . . sizes ½″ to 3″ ips . . . pressures to 300 psi . . . and a variety of body, seat and internal materials for liquid or gas control. *Write for General Controls' new H-O Hydramotor Catalog!*

ELECTRIC MOTOR VALVE...*without gears!*

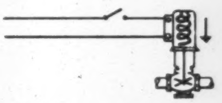



Simple two-wire control
Low or line voltage
Optional integral SPDT switch can energize circulating pump after valve opens
Operator sealed in oil
–no maintenance
–quiet operation
No wear
–no links, gears or levers
No packing leaks, no adjustments
–spring-loaded teflon packing
in-line actuator and valve body
tight shut-off
–soft, synthetic rubber seats
½" to 3" IPS
Normally open, normally closed, or three-way
Iron or bronze valve bodies
25, 125 or 250 WSP

H-O SERIES HYDRAMOTOR VALVES

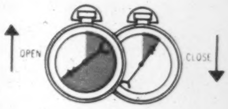

LIMIT
LOW OR LINE VOLTAGE

TWO-WIRE CONTROL
Means lower cost . . . no complex wiring layouts for the engineer — no complicated hookup for the installer. Only two wires to string. Hydramotor Valves are controlled by readily-available standard low voltage limit controls or thermostats.

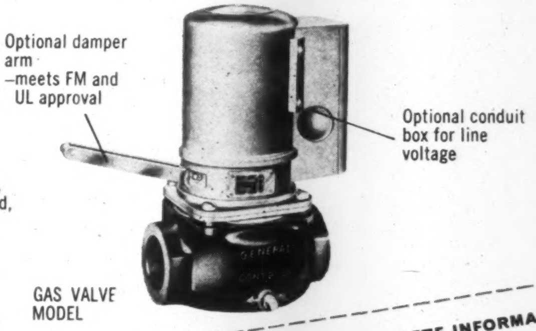


FAIL-SAFE
. . . Inherent safety feature of Hydramotor Valves. Spring-loaded actuator returns valve stem to normal (de-energized) position upon current interruption or current failure.

POWERFUL HYDRAULIC FORCE
High thrust exerted to valve stem by powerful hydraulic force to open against pressures up to 300 psi. Rugged electric motor sealed in its own hydraulic oil drives positive displacement type pump.



CHOICE OF 4 OPERATING SPEEDS
SLOW (10 or 40 sec.) OPENING with FAST (5 sec.) CLOSING for safe, sure ignition on high volume gas burners . . . fast shut-down in response to safety controls.
SLOW (10 to 40 sec.) OPENING with FAST (5 sec.) or SLOW (40 sec.) CLOSING. Slow closing eliminates damaging and annoying water hammer.


Optional damper arm
–meets FM and UL approval
Optional conduit box for line voltage

GAS VALVE MODEL

WRITE TODAY FOR COMPLETE INFORMATION!
Tear out this coupon and mail for free catalog

GENERAL CONTROLS
801 Allen Avenue, Glendale 1, California
Department 200-N

Please rush free copy of your new catalog on the H-O Series Hydramotor to:

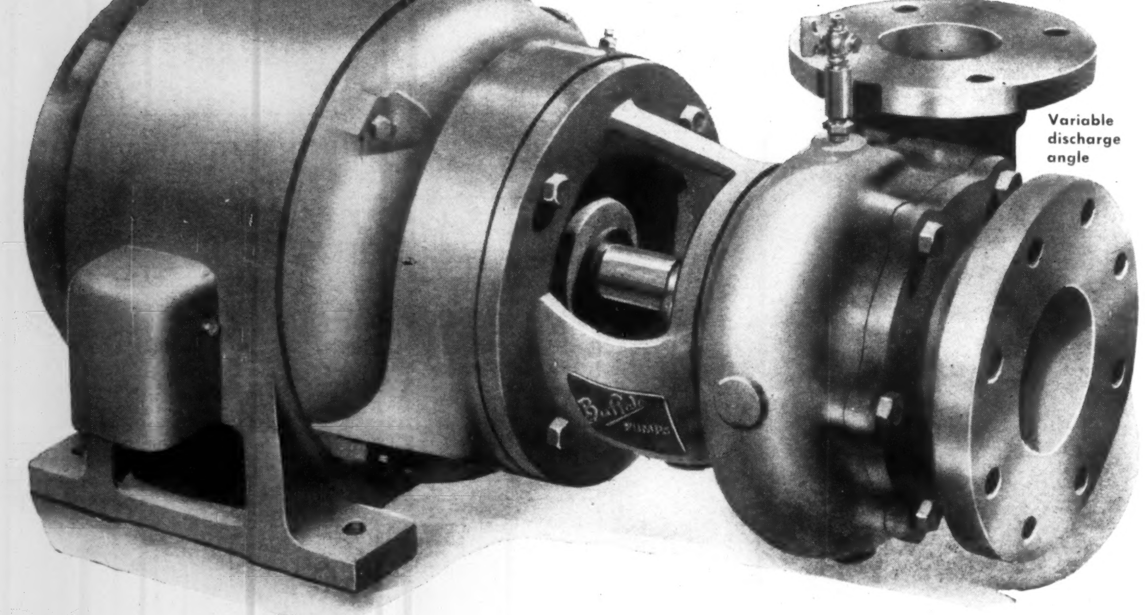
Name__________ Title__________
Company__________
Street__________
City & State__________

GENERAL CONTROLS

Five Plants:
Glendale, California
Burbank, California
Iron Mountain, Michigan
Skokie, Illinois
Guelph, Canada

America's Finest Automatic Controls for Home, Industry, and the Military

40 Factory Branch Offices
Serving the United States and Canada



Variable discharge angle

Easily mounted, horizontal or vertical

No shaft alignment problem on installation or later

Rugged Solid Shell

Removable side plate

SMALL SIZE – BIG PERFORMANCE –FLEXIBLE INSTALLATION

These husky, compact pumps fit into cramped quarters with ease and deliver big-pump performance with a minumum of installation and service time.

"Buffalo" Close-Coupled Pumps have permanently aligned shafts plus adjustable discharge angle, affording wide flexibility in mounting and piping. And beyond these advantages, they're built for the reliability and efficiency inherent in all "Buffalo" Pumps — with deep, 8-ring stuffing boxes — oversize shafts — sturdy casings with passages offering minimum friction — overall solidity and strength — and the well-known efficient "Buffalo" impellers.

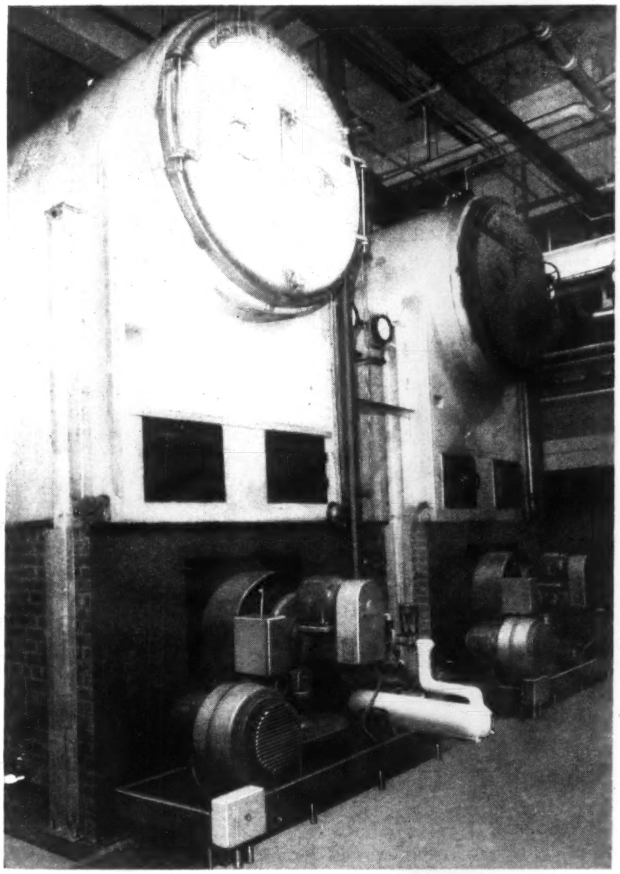
For many clear water services, including chilled water, "Buffalo" Close-Coupled Pumps are the logical choice for yourself and the customer. Write for Bulletin 975-D for a check on sizes, specifications and performance.

"BUFFALO" CLOSE-COUPLED PUMPS FOR CLEAR WATER **1" to 6" sizes** **10 to 1100 gpm**
Up to 360-ft. head (300 gpm)

BUFFALO PUMPS
Division of Buffalo Forge Co.
171 Mortimer St. • Buffalo, N.Y.

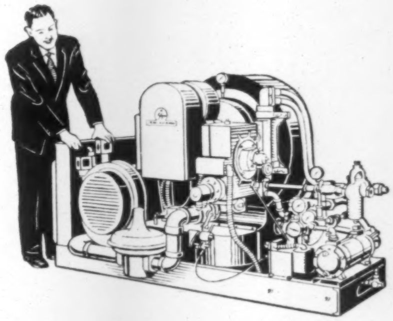
Canada Pumps, Ltd., Kitchener, Ont. *Sales Representatives in all Principal Cities*

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID



Iron Fireman packaged oil firing units applied to firebox boilers. These units are suitable for nearly all types of steam or hot water boilers. The heating plant shown above is in the office building of the Celanese Corporation of America, Charlotte, N. C.

A complete firing system by Iron Fireman



Engineered as a unit . . .
installed as a unit

For oil, gas or oil-gas combination

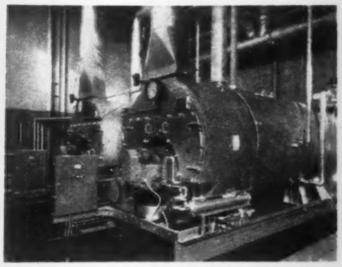
Here is a *factory engineered* firing system. Everything needed for balanced firing is mounted on a rigid steel base, ready to bolt to the boiler front. Nothing is left to the uncertainties of local assembly. For example, the critical refractory firing throat is pre-cast and installed at the factory, rather than being molded on the job. It is critical because proper design and accurate placement of the refractory tile increases combustion efficiency. It is scientifically designed to introduce secondary air around the burner head, avoiding the elaborate firebox brickwork in the typical conversion job.

Accurate control of all firing functions Every factor that affects firing efficiency is engineered into the unit at the factory. The unit includes: (1) Single or dual-fuel burner, with complete fuel handling systems. (2) Forced draft air supply. (3) Enclosed control panel, with instruments mounted, factory wired and tested, and with signal lights and dials that afford a complete reading at a glance.

In the oil-gas units, fuels can be switched automatically, or with the simple flick of a switch. Fires any fuel gas or any commercial grade of fuel oil available, including No. 6, without changing burner adjustment.

Local service. Hundreds of dependable Iron Fireman dealers are located in all parts of the United States and Canada. Their factory trained personnel are ready to furnish quick service to your burner, should the need arise. In addition, factory engineers are available in most areas to help you and your consulting engineer in planning boiler room modernization or construction.

For further information, mail coupon.



With matched Scotch type boiler

America's top boiler manufacturers join with Iron Fireman to produce boiler-burner units in which the boiler and firing system are engineered as a single integrated unit. Hundreds of these installations are in use in all parts of the world, with outstanding performance records. The boiler room, shown above, equipped with Iron Fireman-Kewanee units, is in one of the Detroit plants of the Briggs Manufacturing Company.

Iron Fireman®

THE IRON FIREMAN

AUTOMATIC FIRING EQUIPMENT FOR OIL, GAS, COAL

Please meet us at the International Heating and Air Conditioning Exposition— Chicago. SPACE 224

IRON FIREMAN MANUFACTURING CO.
3361 W. 106th Street, Cleveland 11, Ohio
(In Canada, 80 Ward Street, Toronto, Ont.)

Please send information on Iron Fireman forced draft firing for oil, gas, or oil-gas combination.

Name____________________

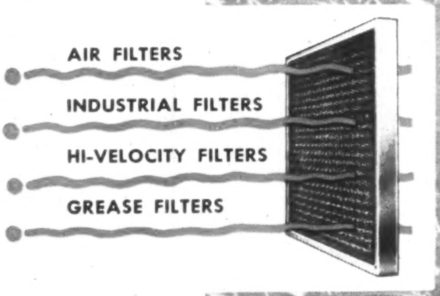
Firm____________________

Address____________________

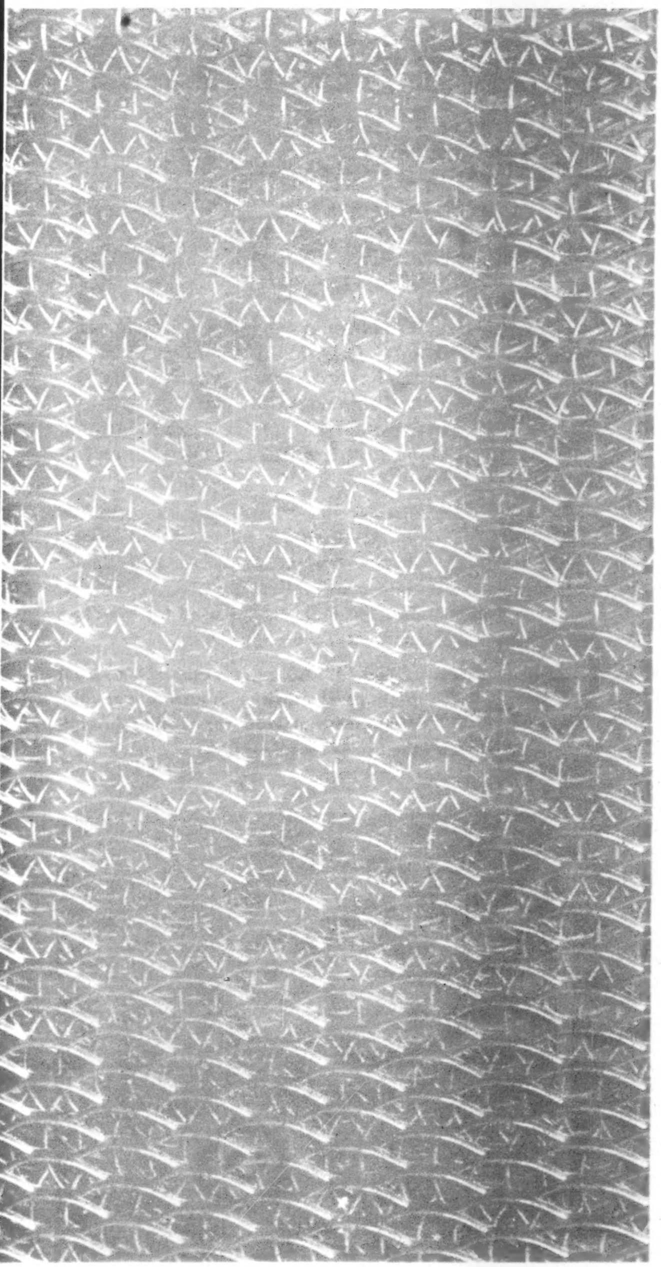
City________________ State________

48% More Air Delivery

...from initial resistance to 1.00" wg with superior air cleaning efficiency


AIR FILTERS
INDUSTRIAL FILTERS
HI-VELOCITY FILTERS
GREASE FILTERS

Evans Lifelong AIR



NEW . . FREE-FLOW AIR CLEANING ACTION

Super cleans the air . . . without choking it off. Lets blower deliver at peak efficiency during filter loading cycle. As filter loads, static pressure rise is low and slow.

NEW . . FASTER RELEASE OF COOLED AIR FROM COOLING COILS

Air delivery system remains in balance. No sudden jump . . . no sharp rise in resistance. Resistance rise is slow even from 0.50″ wg to 1.00″ wg or 1.25″ wg, or on to resistance level desired. Even high lint (or fibrous material) content in the air does not materially affect its performance. Special pack design handles fluffy dust without strangulation of air. Big dust storage capacity is the secret. It offers a safety factor—stores dust, yet lets the air through.

NEW . . BIG CAPACITY DESIGN

Enables Evans filter to catch and hold lint without choking off air stream. Particularly desirable in both industrial and commercial application where face over is a problem.

NEW . . EXTRA HEAVY LIFETIME CONSTRUCTION

All aluminum (heavy gauge). Every part precision made—precision assembled.

NEW . . SAVES 50% ON CLEAN AIR MAINTENANCE COSTS

One set of Evans filters last life of air handling system. No heavy high-tension adhesive oil. Evans fluid (which is light) has *built-in* detergent for *double quick* cleaning.

NEW . . DELIVERS MORE AIR PER KILOWATT OF ELECTRICITY

Holds power costs down. Lets fan deliver full load of air. Minimizes running time.

FILTERS

FREE LITERATURE MAIL COUPON TODAY!

THE GEORGE EVANS CORP. . . . MOLINE, ILLINOIS

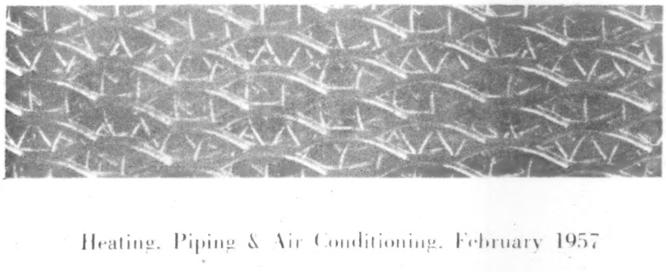
Gentlemen: Rush me full details on the NEW HIGH CAPACITY EVANS FILTER that delivers 48% more air from initial resistance to 1.00″ wg.

NAME____________________________

COMPANY____________________________

ADDRESS____________________________

CITY____________________STATE__________



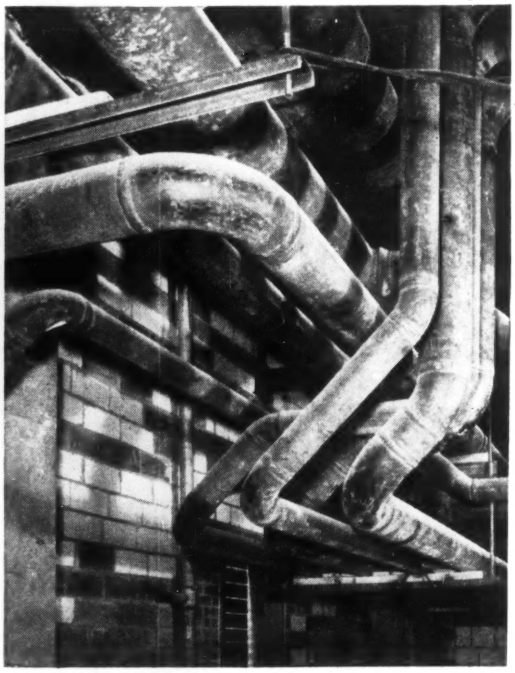
NATIONAL SEAMLESS PIPE

used for heating and air conditioning system of new Texas National Bank Building

USS National Seamless Pipe, in sizes from 4″ O.D. to 16″ O.D., was utilized in the heating and air conditioning system of this new Houston, Texas, building, owned jointly by Texas National Bank and Continental Oil Co., as follows:

Sizes 4″, 6″, 8″, 10″ and 12″ are used for combination hot and chill water lines to the primary and zone conditioners as well as the perimeter units. The 16″ O.D. pipe is used for handling condenser water.

The 14″ O.D. pipe is part of the steam piping system which in turn converts the water into hot water for heating through the use of converters.



USS National Seamless Pipe is consistently the number one choice of engineers and contractors throughout the country for air conditioning, heating and power installations. Its ability to render efficient, trouble-free service under all types of pressure and temperature conditions has given National Seamless a reputation for safety and dependability excelled by no other pipe. For further information, or assistance with your pipe problems, get in touch with our engineers.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

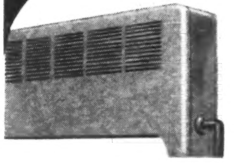
NATIONAL Seamless PIPE AND TUBES

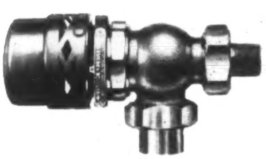
WALLS WITHOUT WELDS

UNITED STATES STEEL

NO MATTER HOW IT'S HEATED

Control it the FULTON SYLPHON way



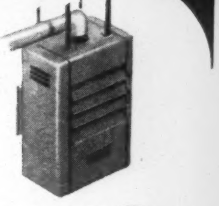


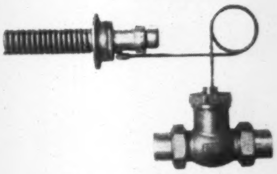
RADIATORS • CONVECTORS

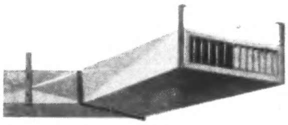
Automatic valves and regulators control steam or hot water radiators and convectors for individual room or zone control. Thermostatic valve shown is completely self-contained and self-powered. Other types are self-powered or electrically-operated, with adjustable dials or wall thermostats. For air temperatures up to 170° F.

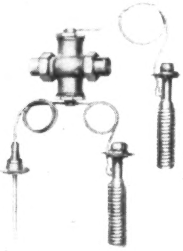
UNIT HEATERS • VENTILATORS

Fulton Sylphon regulators are the low cost way to control space or air discharge temperatures using steam-coil equipped heaters, ventilators, or conditioners. Completely self-powered—no operating cost. Types for fresh or mixed air intakes, with or without "droop" compensating bulbs. Ranges up to 170° F.







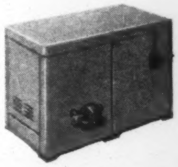


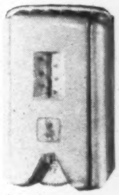
DUCT TYPE and PACKAGED CONDITIONERS

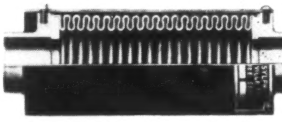
Central fan or split system, fresh air or mixed intake, Fulton Sylphon self-operated regulators modulate steam supply to keep space or air discharge temperatures at desired level. Types with adjustable thermostatic bulbs, wall thermostat, or both. With "weather" compensation, regulators can maintain or increase discharge temperature if supply temperatures fall.

ELECTRIC HEATERS • EQUIPMENT

Operated on line voltage, 800 Series room thermostats regulate heating, cooling, or both with a sensitivity of ± ½° F. Can directly regulate electric cable or radiant panels, wall and unit heaters, portable heaters, and baseboard units. Can turn stokers, oil burners, fans, circulating pumps, or air conditioners on and off. Ranges to 85° F.



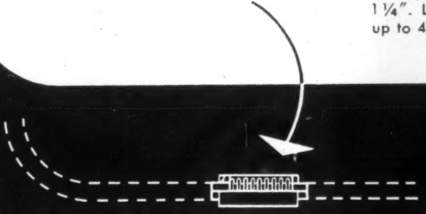




HEAT SUPPLY LINES

There's no need for loops or packing maintenance when Fulton Sylphon Packless Expansion Joints take up expansion in steam or hot water supply lines and finned convectors. Two-ply seamless Sylphon® Bellows solves leakage problems, permits expansion up to 1¼". Low-cost type shown takes pressures up to 40 psig, other types up to 100 psig.

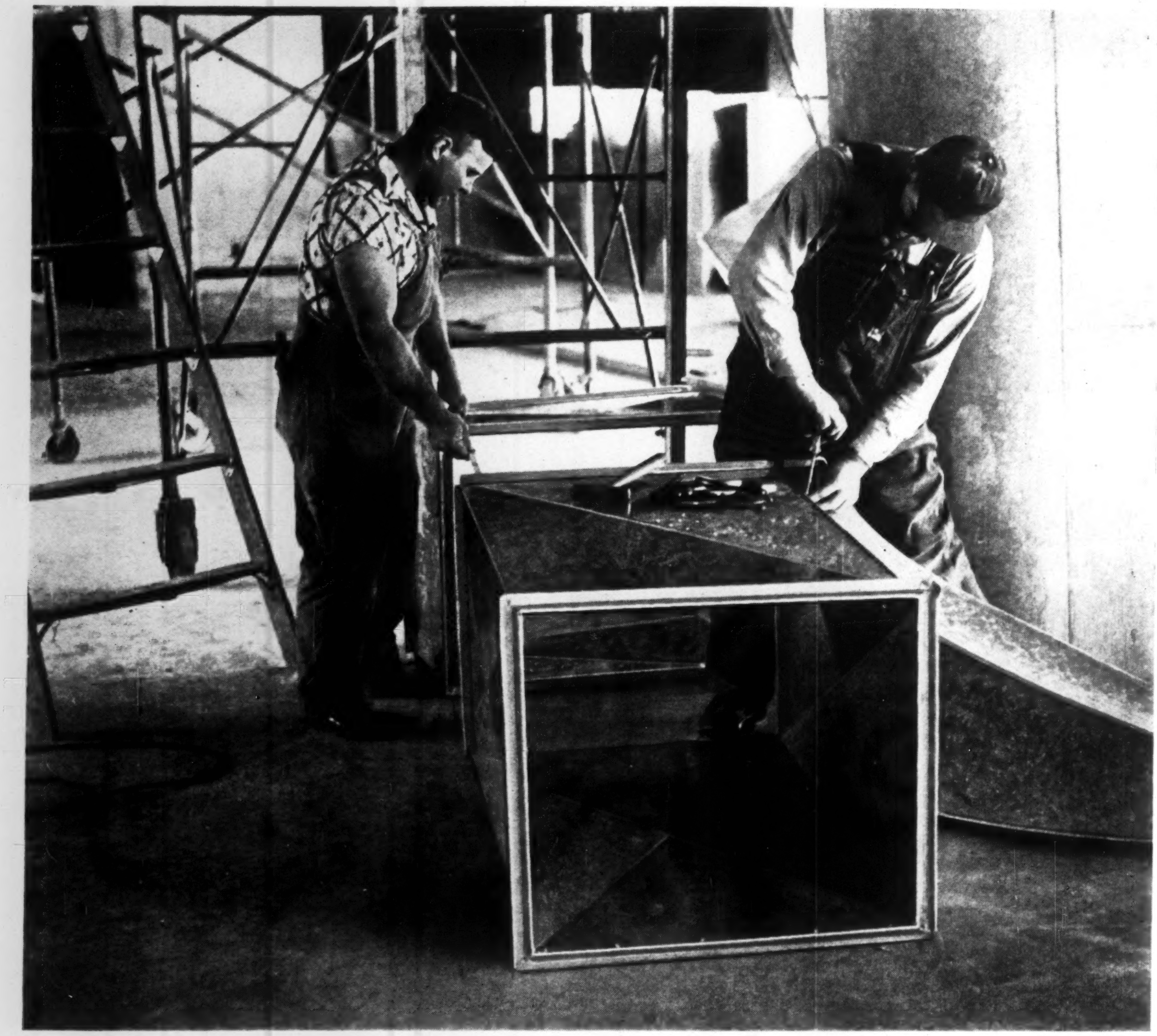
SEND TODAY FOR CATALOG E-CH



You Are Invited To Visit US At
INTERNATIONAL HEATING & AIR CONDITIONING EXPOSITION
Chicago — February 25 to March 1
BOOTH 1050

Mr. Controls

Robertshaw-Fulton®
CONTROLS COMPANY
FULTON SYLPHON DIVISION • Knoxville 1, Tenn.



Why sheet-metal men enthuse over Bethcon

The more we get around among sheet-metal contractors, the more evidence we discover of the growing enthusiasm for Bethcon galvanized steel sheet.

"That coating is terrific," they say.

"Bethcon is strong, but flexible too."

"The way it holds up under tough forming like snap locks or Pittsburgh lock seams!"

"Coating so uniform makes forming easy."

Comments like these can be heard wherever the new Bethcon sheets are in use. And the reason for them is Bethlehem's continuous galvanizing process. In this method, sheet steel receives a zinc coating so tight that severe bending won't crack it, so uniform that any variation in thickness is difficult to measure. And that old-fashioned heavy beading on the drip end is now a thing of the past.

Give Bethcon a tryout in your shops. You can specify it in cut lengths or coils, 14-gage or lighter. You can also choose between plain carbon steel and corrosion-resisting Beth-Cu-Loy (copper-bearing steel) for the base metal, depending on your requirements. Our nearest district office will gladly furnish further details about Bethcon.

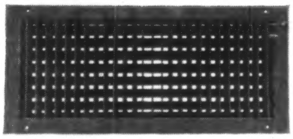
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

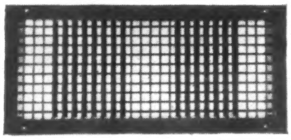
BETHLEHEM STEEL

BETHLEHEM STEEL

. . . a hard, silver-blue, baked, deluxe finish over prime coat—a quality finish for a quality product — — and job-painting is eliminated.



STYLE DVL



STYLE DDV

And—do you know that—

STEWART outlets provide the industry's maximum free area—

All STEWART register faces are available with Opposed - Action Valves or 1″ Parallel - Acting Multivalves at a lower price.

Most STEWART products are available in Stainless Steel—Solid Bronze—All Aluminum.

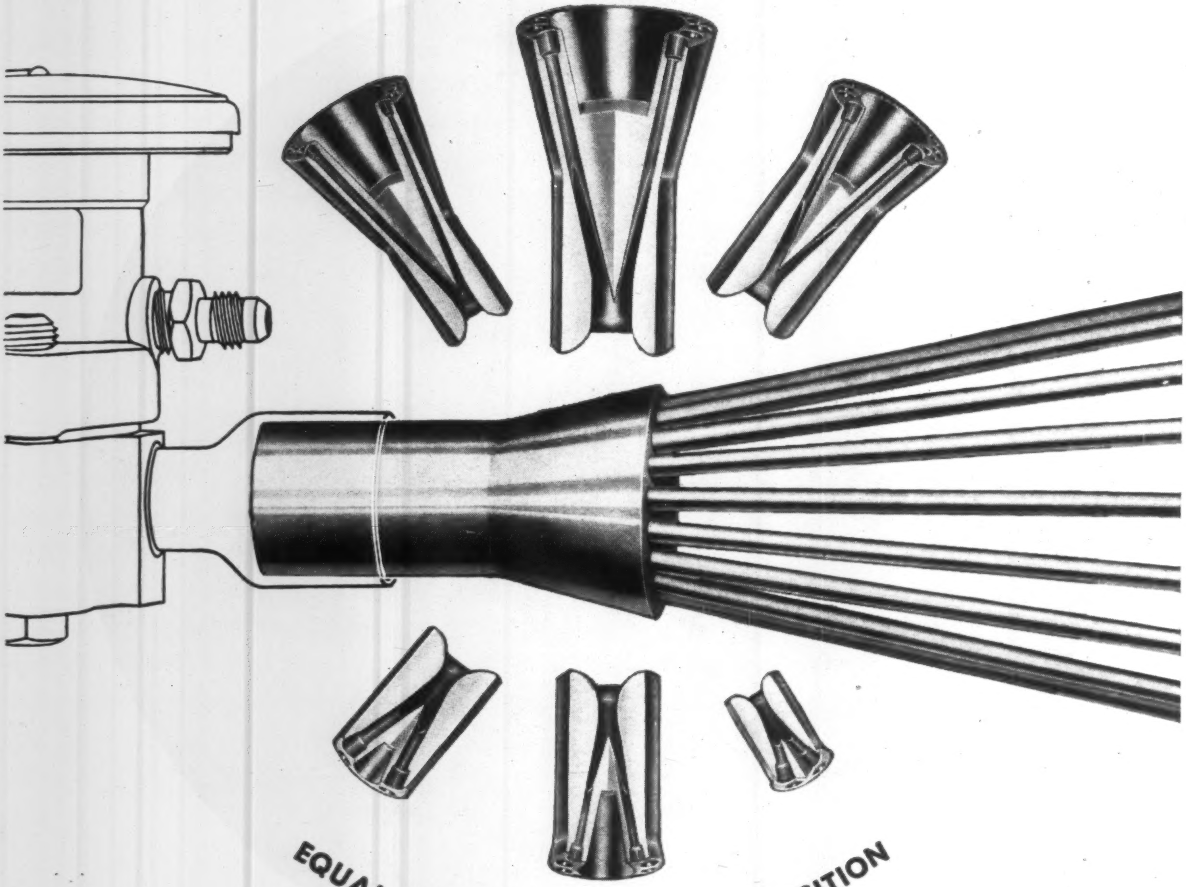
An inquiry on your letterhead will receive the prompt, courteous attention of a representative.

Stewart

MANUFACTURING COMPANY, INC.

CEDAR GROVE ESSEX COUNTY NEW JERSEY

3426


EQUAL DISTRIBUTION IN ANY POSITION

one-piece ALCO venturi-flo distributor

Low pressure drop—Permits closer, more economical thermo valve sizing.

Wide application range—from 25% of capacity to 150% of rated capacity.

One-piece—No nozzles or orifice plates to stock and install.

One Venturi-Flo replaces distributors requiring as many as 6 or 7 nozzles!

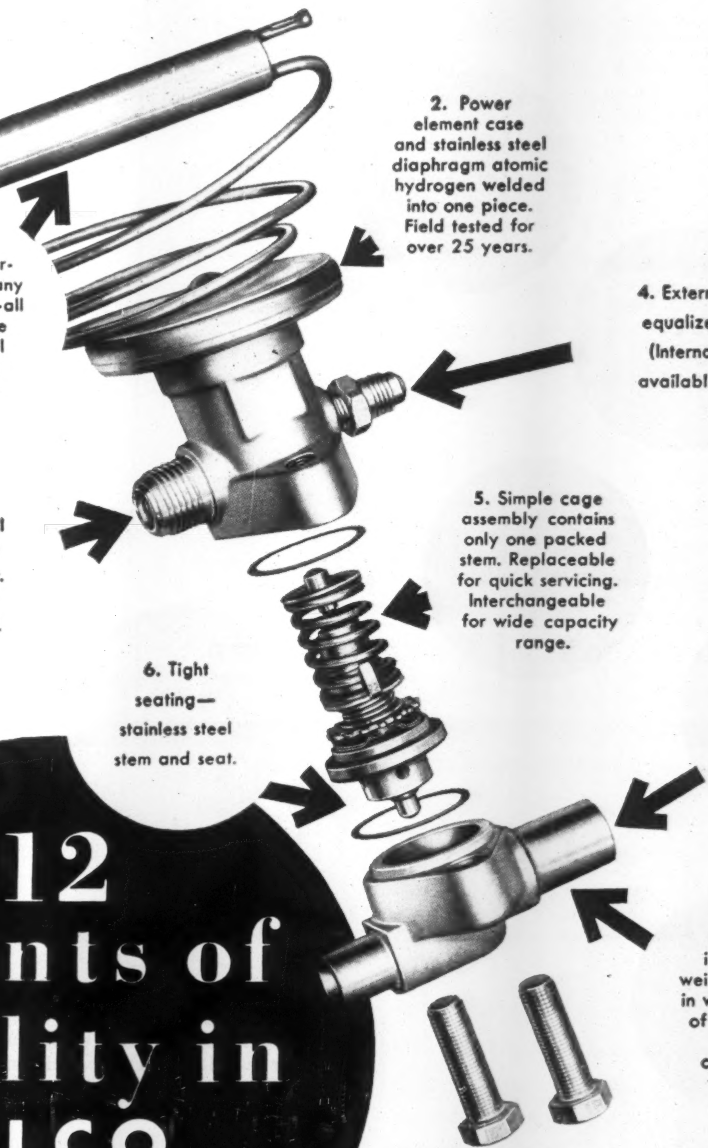
Easy to select—No nozzles to size.

BUY QUALITY— BUY ALCO WRITE FOR BULLETIN 188-55

SEE THEM AT ALCO BOOTH...
No. 1163

CHICAGO — FEB. 25 - MAR. 1

INTERNATIONAL HEATING & AIR CONDITIONING EXHIBIT



2. Power element case and stainless steel diaphragm atomic hydrogen welded into one piece. Field tested for over 25 years.

1. Field proven supercharges for any application—all temperature ranges—all operating conditions.

4. External equalizer. (Internal available).

3. External superheat adjustment. (Internal available).

5. Simple cage assembly contains only one packed stem. Replaceable for quick servicing. Interchangeable for wide capacity range.

6. Tight seating—stainless steel stem and seat.

7. Outlet connections to match distributor requirements.

8. Easy to install, light weight flanges—in widest variety of body styles and connections.

12 points of quality in ALCO

"T" SERIES THERMO VALVES

ENGINEERED THROUGHOUT FOR TROUBLE-FREE OPERATION!

9 Rugged come-apart constructions—corrosion-resistant materials.

10 Can be mounted in any position.

11 Simple, compact design — only three major parts—interchangeable to provide wide capacity and operation ranges.

12 Easy to inspect, clean and service without breaking line connections—no special wrenches or gauges required.

BUY QUALITY—BUY ALCO

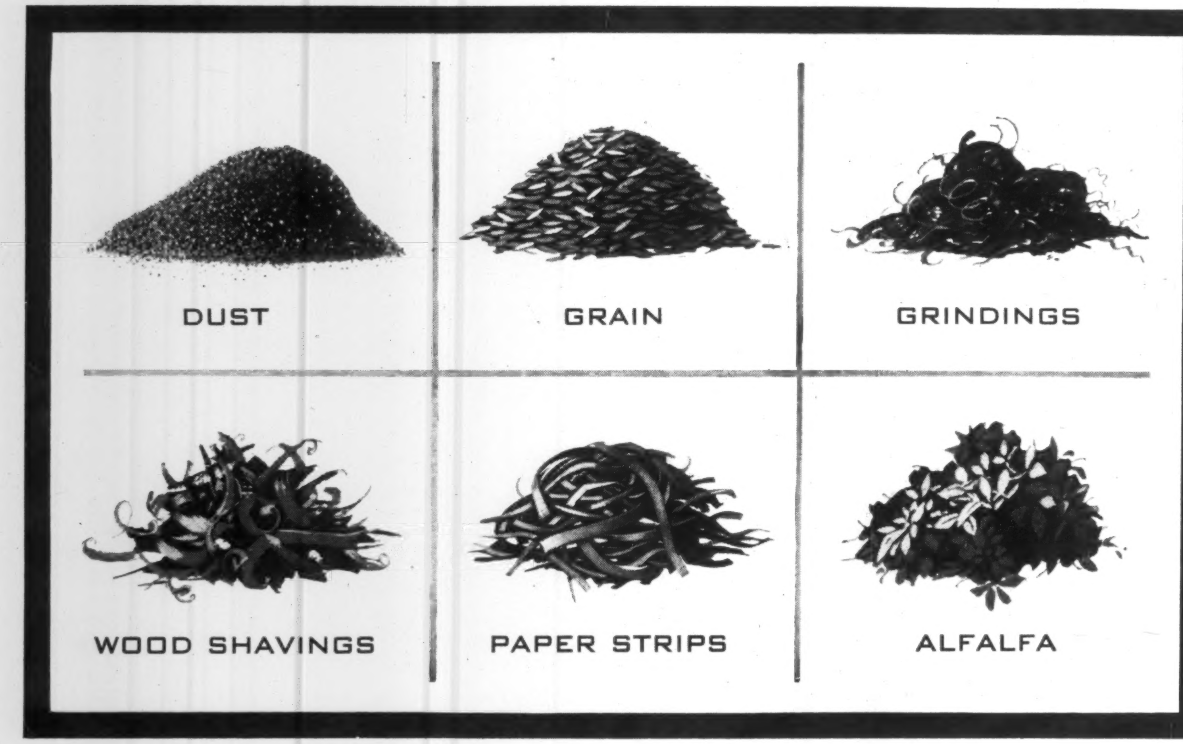
NON-ADJUSTABLE, HERMETICALLY SEALED MODELS ALSO AVAILABLE

WRITE FOR
BULLETIN 171-56

ALCO VALVE CO.
861 KINGSLAND AVE. • ST. LOUIS 5, MO.

The one complete line of refrigerant controls: Thermostatic Expansion Valves, Refrigerant Distributors, Solenoid Valves, Suction Line Regulators, Flooded Evaporator Controls and Reversing Valves.

7217



American Blower Industrial Fans take large or small particles right in stride!

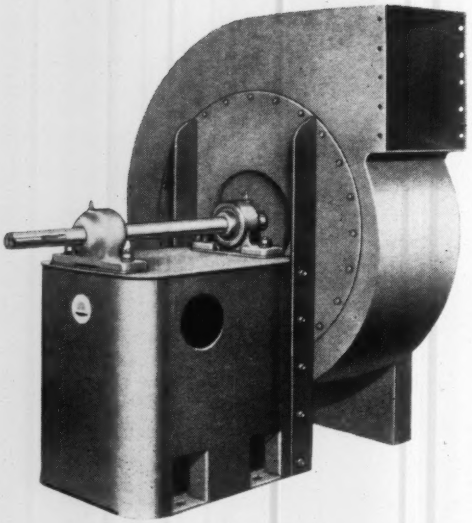
The secret is their versatility. You see, the American Blower Industrial Fan is available with three types of wheels: Type AH for air handling, Type MH for material handling, Type LS for long shavings.

And there's a wide range of fan arrangements, optional constructions—for severe duties or high-temperature operation—and optional accessories to allow fan modification to suit an individual job.

What's more, it's available as a packaged fan—that is, a self-contained unit with its own motor, drive and weather-proof hood enclosure. This eliminates the need for a separate motor foundation, and the complications of motor lineup, belt centers and weather protection.

If you have a process application involving air, gas, or material handling, why not consider our industrial fan? Your nearest American Blower branch-office man is the one to call. His intimate knowledge of the special problems of many industries—and his complete product-line—is at your disposal.

American Blower Division of American-Standard, Detroit 32, Michigan. In Canada: Canadian Sirocco products.



Lick tough process applications with the versatile American Blower Industrial Fan.

AMERICAN BLOWER

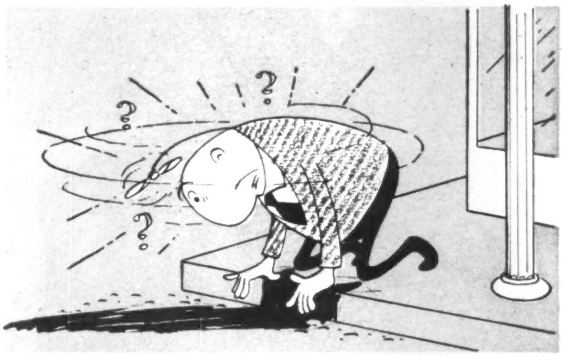
Division of **American-Standard**

HOW *Cool Carl* the Competent Contractor

Picked Quality

To be sure that every one of his air conditioning installations was the best, Carl needed top quality in every component —

He knew he couldn't pay a premium price



He knew he couldn't find quality on a street corner

He knew he couldn't afford trial-and-error

He knew . . .

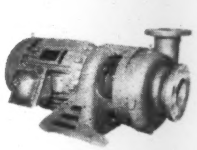
ALLIS-CHALMERS Air Conditioning Pumps

Give season-after-season dependability . . . at low cost per gallon pumped

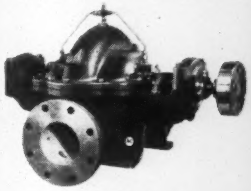
Cool Carl hit quality "right on the nose" and so reduced service call-backs when he specified Allis-Chalmers air conditioning pumps.

Like so many air conditioning contractors, Carl knew that Allis-Chalmers pumps offer: HIGH HYDRAULIC EFFICIENCY; NO-MAINTENANCE SEALING; MOISTURE-PROOF BEARINGS; and many other cost-saving design features.

You'll get top quality too by specifying Allis-Chalmers pumps. See your local A-C representative or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.



Fractional and Integral Horsepower pump line has capacities to 2500 gpm, heads to 400 feet. Close-coupled models have only two base sizes for entire line . . . only two bolts needed to install.



Other Types of Centrifugal Pumps by Allis-Chalmers provide heads up to 550 feet and capacities to 2500 gpm. Various models available cover 99% of all air conditioning jobs.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

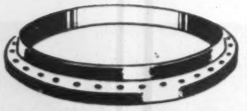
A-5239

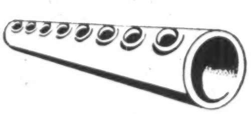
Build for the future ....

TAYLOR

20" 1500 TF TAYLOR FORGE A1 II FCH 140 R75

Welding nozzles

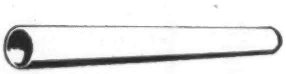

T.E.M.A. flanges and channels

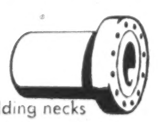

Multiple outlet headers

Production forgings

Venturi reducers

Spiral weld pipe

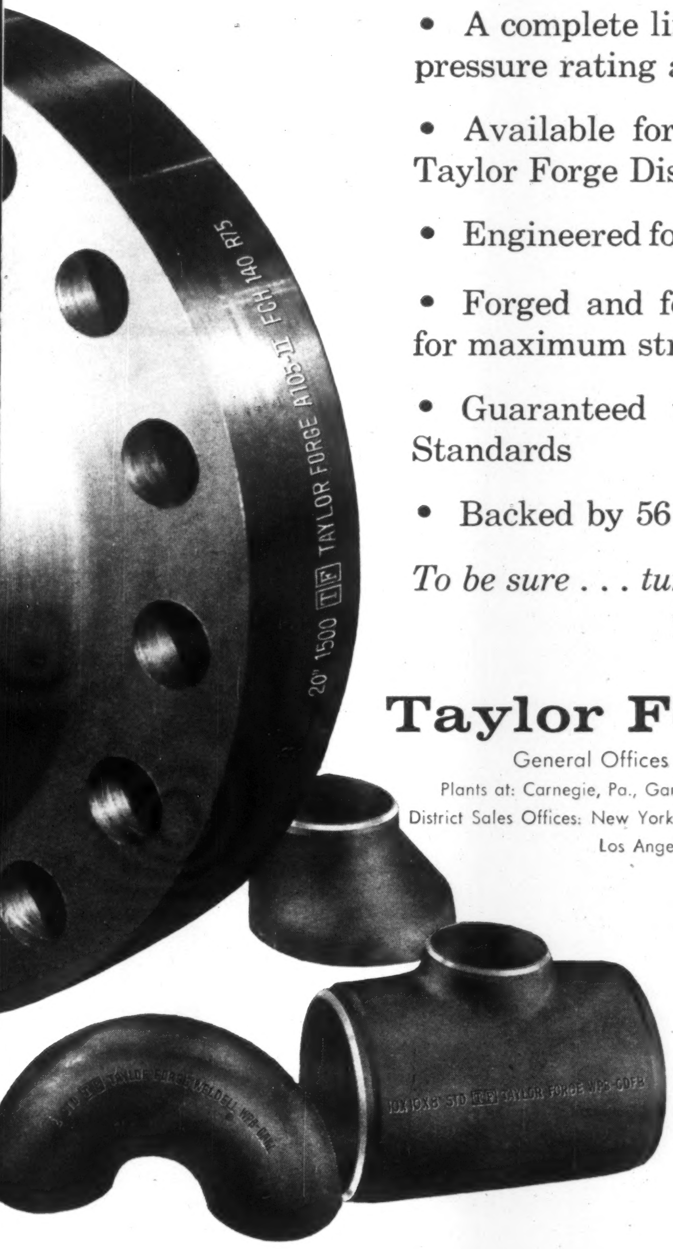

Large diameter electric weld pipe


Welding necks

-- today ---------- with

FORGE

Welding Fittings and Forged Flanges



- A complete line . . . in every type, size, thickness, pressure rating and material
- Available for prompt delivery from your nearby Taylor Forge Distributor
- Engineered for the utmost in accuracy and precision
- Forged and formed by the most modern methods for maximum strength and stamina
- Guaranteed to meet all American Codes and Standards
- Backed by 56 years of experience.

To be sure . . . turn to Taylor Forge . . .
TRADITIONALLY DEPENDABLE

Taylor Forge & Pipe Works

General Offices and Works: P. O. Box 485, Chicago 90, Illinois
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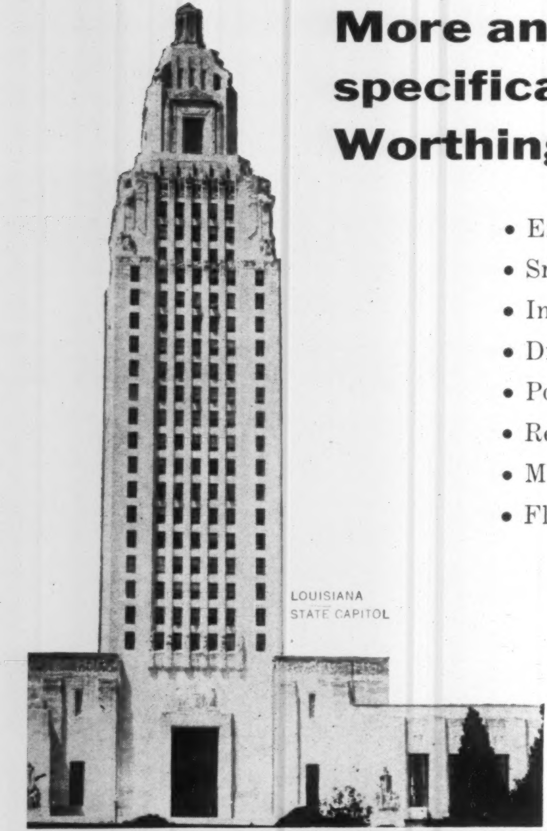
District Sales Offices: New York, Boston, Philadelphia, Pittsburgh, Atlanta, Chicago, Houston, Tulsa, Los Angeles, San Francisco, Seattle, Toronto, Calgary.

PROMPT SERVICE FROM YOUR NEARBY TAYLOR FORGE DISTRIBUTOR

He's as near as your telephone . . . and he carries a full stock of Taylor Forge Welding Fittings and Forged Flanges. You'll find his service efficient and reliable . . . and through him you also have available the services of Taylor Forge engineers for advice and counsel on any piping problems.

More and more air conditioning specifications call for Worthington Induction Systems



- Exceptionally quiet operation
- Small, space-conserving ducts
- Individual room or occupant control
- Draft-free air distribution
- Positive ventilation
- Remote location of all mechanical equipment
- Minimum, centralized maintenance
- Flexibility of partition changing.

WORTHINGTON

CLIMATE ENGINEERS TO INDUSTRY, BUSINESS AND THE HOME

A few of the many modern American buildings for which the new Worthington high pressure induction air conditioning system has been specified.

CHESAPEAKE & POTOMAC TELEPHONE CO., RICHMOND, VA.
Engineer: Baskerville & Son, Richmond, Va.
Architect: Same
Contractor: Wachter & Wolff, Richmond, Va.

N. Y. STOCK EXCHANGE BUILDING (20 BROAD ST.) NEW YORK, N. Y.
Engineer: Jaros, Baum & Bolles, New York, N. Y.
Architect: Kahn & Jacobs & Sidney Goldstone, New York, N. Y.
Contractor: Raisler Corp., New York, N. Y.

UNIVERSITY OF NEBRASKA LINCOLN, NEBRASKA
Engineer: Carl Goth, Omaha, Nebraska
Architect: Hazen & Robinson, Lincoln, Neb.
Contractor: Ray Martin Co., Lincoln, Neb.

LACKLAND AIR FORCE BASE SAN ANTONIO, TEXAS
Architect: Associated Architects, Houston, Texas & York & Sawyer, New York, N. Y.
Contractor: C. Wallace Plumbing Co., Houston, Texas

LIFE & CASUALTY INSURANCE CO. NASHVILLE, TENN.
Engineer: Burns & Thorpe, Memphis, Tenn.
Architect: Edwin A. Keeble Assoc., Inc., Nashville, Tenn.
Contractor: Buchi Plumbing Co., Nashville, Tenn.

MUTUAL BENEFIT INSURANCE CO. NEWARK, N. J.
Engineer: Syska & Hennessy, Inc., New York, N. Y.
Architect: Eggers & Higgins, New York, N. Y.
Contractor: Mance Corp., New York, N. Y.

TRAVELERS INSURANCE CO. HARTFORD, CONN.
Engineer: Jansen & Rogan, New York, N. Y.
Architect: Voorhees, Walker, Smith & Smith, New York, N. Y.
Contractor: Alvord & Swift, New York, N. Y.

LOUISIANA STATE CAPITOL BATON ROUGE, LA.
Engineer: De Laureal & Moses, New Orleans, La.
Architect: Dreyfus, Seiferth & Gibert, New Orleans, La.
Contractor: James F. O'Neil, New Orleans, La.

BANK OF NEW YORK NEW YORK, N. Y.
Engineer: Voorhees, Walker, Smith & Smith, New York, N. Y.
Architect: Same
Contractor: J. L. Murphy, Inc., New York, N. Y.

AMERICAN MUTUAL HARDWARE INSURANCE CO. MINNEAPOLIS, MINN.
Engineer: Thorshov & Cerny, Minneapolis, Minn.
Architect: Same
Contractor: Spencer Air Conditioning Co., Minneapolis, Minn.

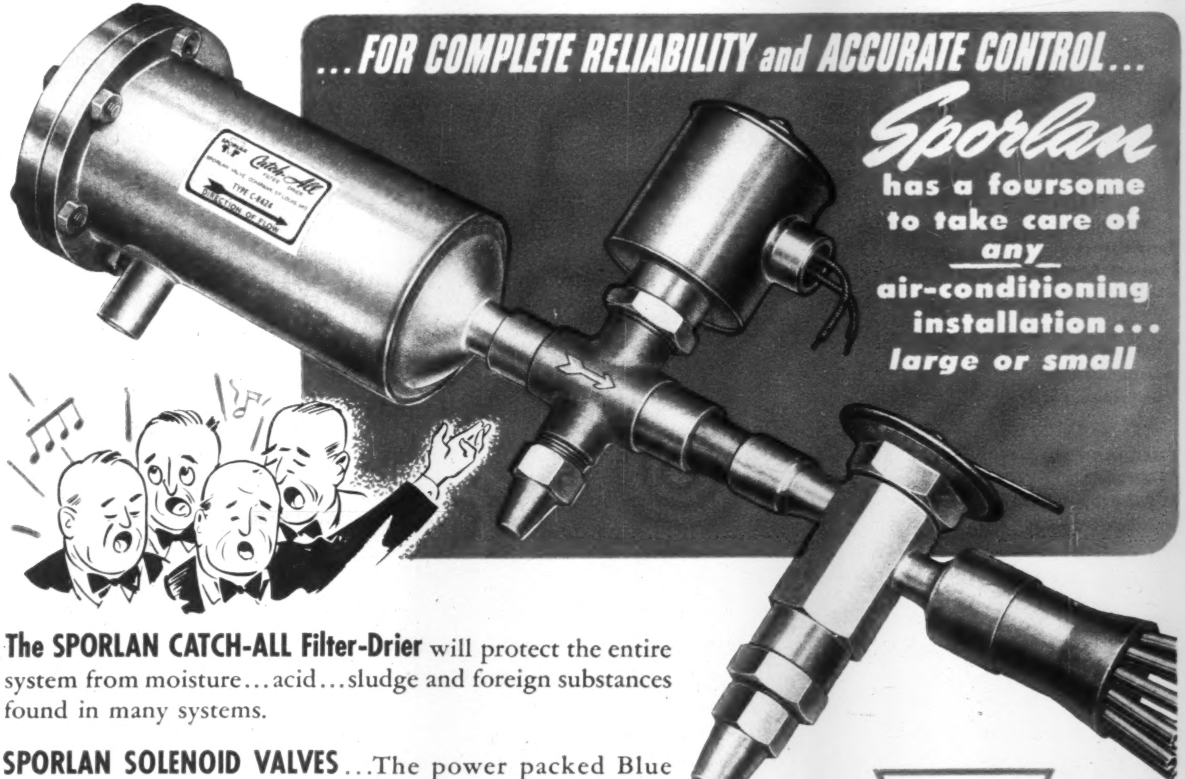
QUINCY MUTUAL FIRE INSURANCE CO., QUINCY, MASS.
Engineer: Cram & Ferguson, Boston, Mass.
Architect: Same
Contractor: C. P. Blouin, Boston, Mass.

ILLINOIS POWER CO. DECATUR, ILL.
Engineer: Holabird & Root & Burgee, Chicago, Ill.
Architect: Same
Contractor: R. H. Bishop Co., Champaign, Ill.

Profit by the experience of these architects, engineers, and contractors. Specify Worthington High Pressure Induction Air Conditioning for your next building. Be sure you're getting the very best. For complete details, write: Worthington Corporation, Section A.6. 124, Harrison, New Jersey.

The PERFECT FOURSOME

for ALL *Air Conditioning* Installations


...FOR COMPLETE RELIABILITY and ACCURATE CONTROL...
Sporlan
has a foursome
to take care of
any
air-conditioning
installation...
large or small
Catch-All
TYPE C-8424
DIRECTION OF FLOW

The SPORLAN CATCH-ALL Filter-Drier will protect the entire system from moisture... acid... sludge and foreign substances found in many systems.

SPORLAN SOLENOID VALVES...The power packed Blue Seal Coil minimizes the possibilities of electrical failures. The simplicity of design and sturdy construction afford Peak Performance always.

SPORLAN THERMOSTATIC EXPANSION VALVES for air conditioning... The famous Flow-Master element practically eliminates valve hunting and the worry of alternately flooded and starved evaporators.

SPORLAN

SPORLAN REFRIGERANT DISTRIBUTORS assure uniform distribution regardless of load... number of circuits... or evaporator temperature. The interchangeable nozzles give them flexibility and a wide range of applications. The perfectly designed conical button assures even distribution to all circuits.

See our exhibit... **BOOTH 1254**
13TH INTERNATIONAL
HEATING AND AIR CONDITIONING EXPOSITION
International Amphitheatre, Chicago
FEBRUARY 25—MARCH 1, 1957

So with this combination...
the Sporlan Catch-All...Solenoid Valve...Thermostatic Expansion Valve and Refrigerant Distributor, you will get Peak Performance right down the line...
See your Sporlan Wholesaler TODAY

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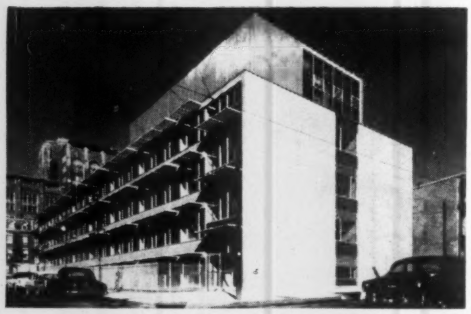


WEIL-McLAIN "HR" SERIES

HEAVY DUTY BOILERS SELECTED FOR ROOF-TOP INSTALLATION

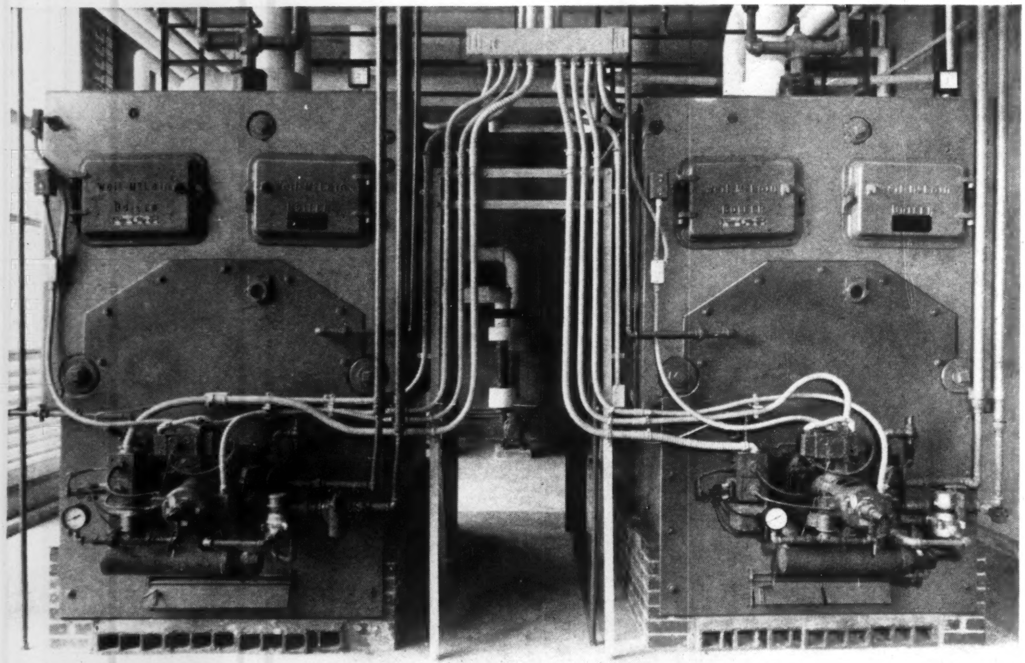
BUILDING
Temple University
Classroom Building
Philadelphia, Pa.

ARCHITECT
Nolen & Swinburne
Philadelphia, Pa.

MECHANICAL ENGINEER
A. Ernest D'Ambly
Philadelphia, Pa.

MECHANICAL CONTRACTOR
Williard, Inc.
Philadelphia, Pa.

DISTRIBUTOR
C. J. Rainear &
Company, Inc.
Philadelphia, Pa.



These Weil-McLain HR-44 Boilers develop 130 H.P.

This pair of WEIL-McLAIN "HR" Series Boilers with rotary oil burners illustrates the trend to penthouse installation of the heating plant. Saving in space and elimination of costly chimneys are notable advantages.

The characteristics of WEIL-McLAIN Cast Iron Sectional Boilers are particularly valuable in this type of installation. The boiler is easier to erect because it can be moved to its site, section by section, at any time during building construction. Less head room and smaller floor area are required—no space needed for pulling tubes. Capacity can be increased at any time by merely adding sections.

In operating economy, the "HR" Series Boiler is completely outstanding. Designed in cooperation with leading makers of horizontal rotary oil burners, it fully develops the economies possible when burning low-cost, heavier oils.

Capacity Range

WEIL-McLAIN HEAVY DUTY BOILERS

OIL
35.3 to 113.3 H.P.

GAS
625,000 to
5,000,000 AGA
input BTU/hr.

Send For Engineering Data

COMPARE THESE WEIL-McLAIN HEAVY DUTY BOILER FEATURES

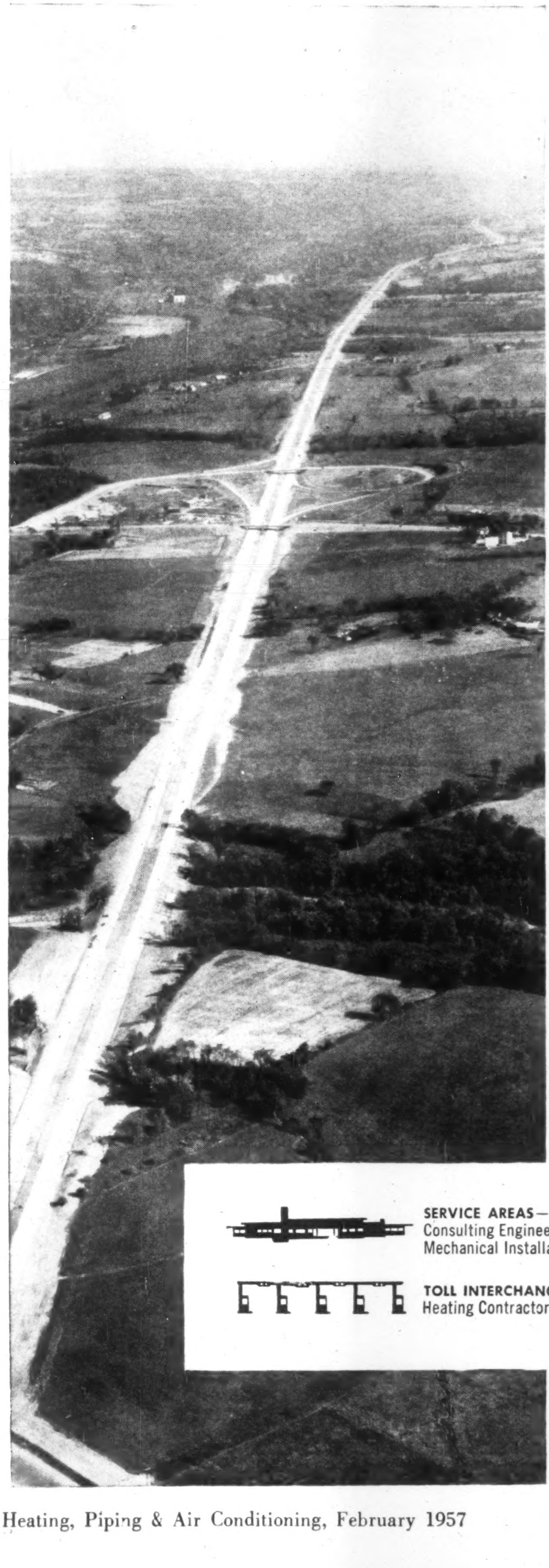
1. Large fuel box volume develops better combustion conditions and maximum radiant heat transmission.
2. Curved primary heating surface greatly increases area directly above the fire.
3. Balanced flue gas travel distributes heat equally to all secondary surfaces.
4. Large waterways assure rapid, efficient water circulation.
5. Cast iron construction for long, trouble-free life.
6. Large steam space permits rapid generation of dry steam.
7. Individual short draw rods simplify assembly.
8. Special steel front plate and section simplify installation of rotary burner.
9. High base enlarges combustion space.

WEIL-McLAIN
BOILERS · RADIATORS

WEIL-McLAIN COMPANY

MICHIGAN CITY, INDIANA

Address Literature requests to Dept. AA-27



427 miles of heating dependability

ASSURED FOR N.Y. STATE THRUWAY!

FIRST . . . By Sarcotherm Weather-Compensated Control Systems for all 40 Toll Interchanges

AND NOW . . . By Sarco Heating Specialties for 23 Service Areas

ON THE NEW YORK STATE THRUWAY, there are now 23 restaurant-gas service areas and 40 toll interchanges along the 427 miles of this great vehicular artery...from New York to Buffalo.

Each of these service areas and toll interchanges has its own heating plant. Therefore, dependability of equipment is of vital importance...for faulty operation or breakdowns would mean heating headaches and call-backs all along 427 miles of highway.

That is one of the principal reasons for the installation of Sarcotherm Weather-Compensated Control Systems for the hot water heating of *all* 40 toll interchanges...and of Sarco Steam Heating Specialties for *all* the 23 service areas now completed.

For undivided responsibility on your installations, specify and order from one "Complete Line" source...SARCO-SARCOTHERM...heating specialties, temperature regulators, condensate and vacuum pumps, finned tube radiation, and weather-compensated control systems for steam and hot water heating. Write for catalogs.

SERVICE AREAS—Architect: Eggers and Higgins. Consulting Engineers: Jaros, Baum & Bolles. Heating Contractors: Joseph Davis, Inc.; Mechanical Installations, Inc.; Harry Hoyle Contracting Co.

TOLL INTERCHANGES—Mechanical Engineers: Syska & Hennessy, Inc. Heating Contractor: Mechanical Installations, Inc.

SARCOTHERM

Sarcotherm Controls, Inc. • Sarco Company, Inc.
Empire State Bldg., N. Y. C.

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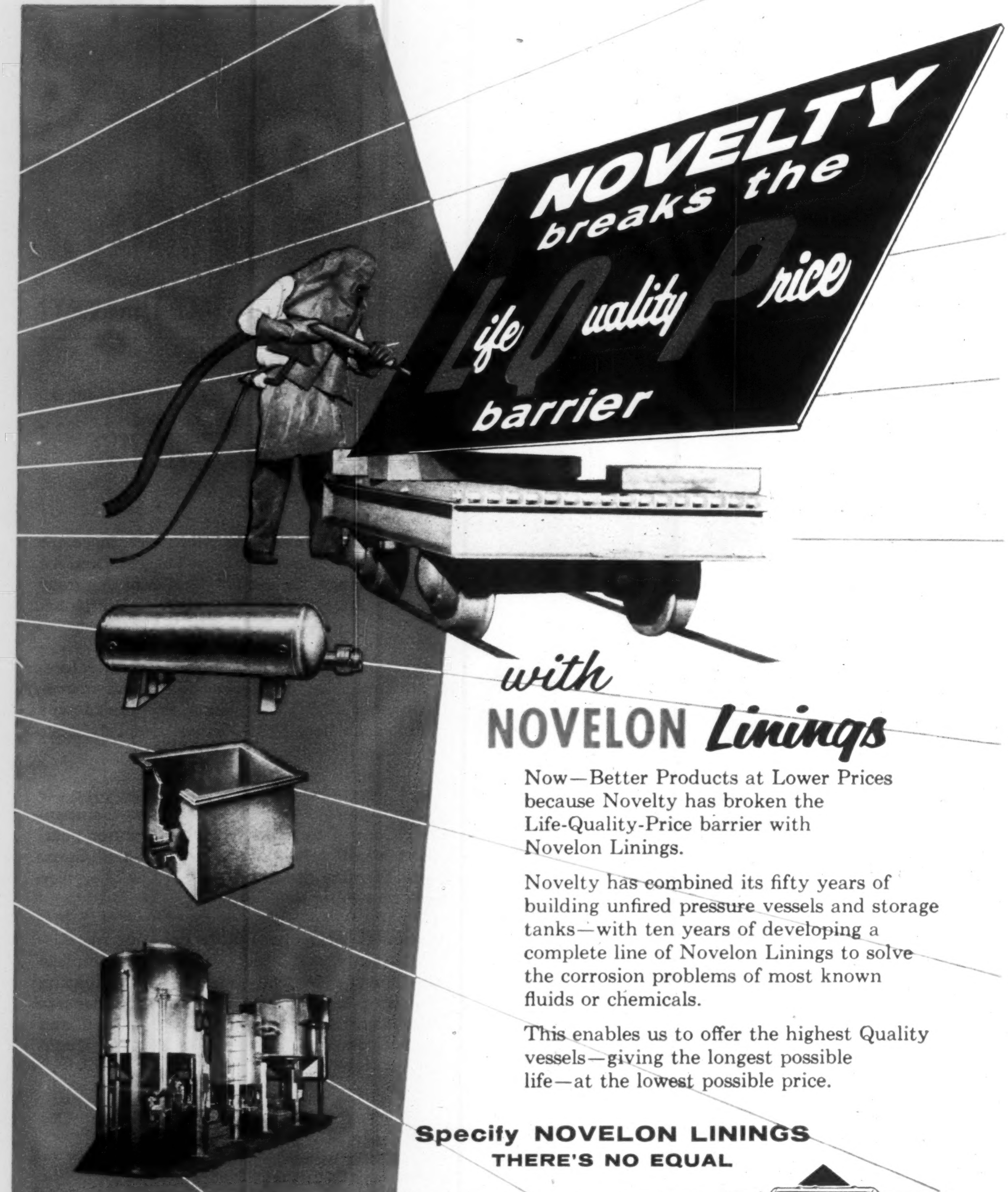
NOVELTY
breaks the
Life Quality Price
barrier

with NOVELON *Linings*

Now—Better Products at Lower Prices because Novelty has broken the Life-Quality-Price barrier with Novelon Linings.

Novelty has combined its fifty years of building unfired pressure vessels and storage tanks—with ten years of developing a complete line of Novelon Linings to solve the corrosion problems of most known fluids or chemicals.

This enables us to offer the highest Quality vessels—giving the longest possible life—at the lowest possible price.

Specify NOVELON LININGS
THERE'S NO EQUAL

HOT WATER GENERATORS
STORAGE TANKS
SPECIAL LININGS
SPECIAL FABRICATION

NOVELTY
STEAM BOILER WORKS INC

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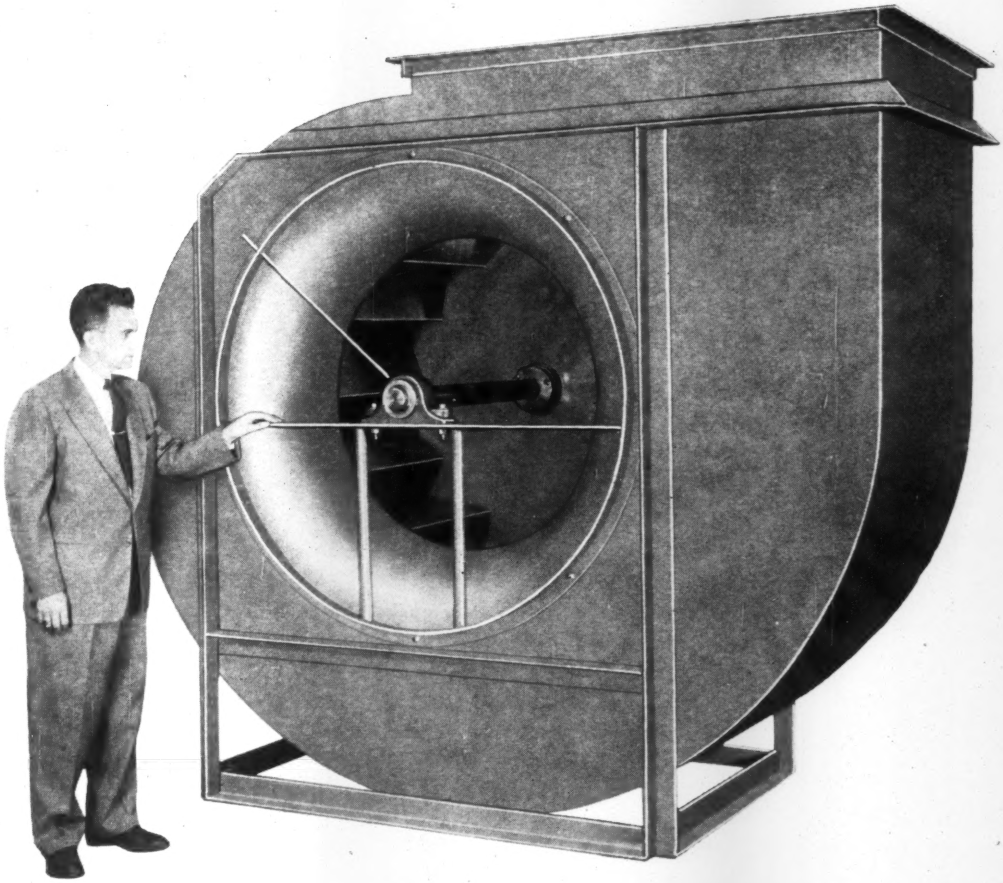
NOVELTY STEAM BOILER WORKS, INC.
2029 KLOMAN ST. • PHONE PLAZA 2-0425 • BALTIMORE 30, MD.



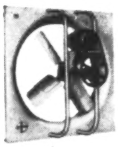
BIG BLOWERS ARE BIG BUSINESS WITH PEERLESS

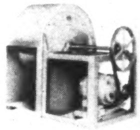
QUIET! • TROUBLE-FREE! • DEPENDABLE! • HEAVY DUTY! • GUARANTEED!

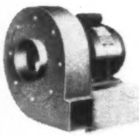
Versatility in size, application, and engineering has always been a Peerless strong point. Peerless builds its own motors and matches them to the specified blower requirements. Peerless blower frames and housings are usually heavier than any competitive products. Result—a quiet, vibration-free unit.

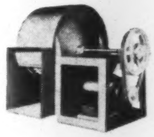
These are not "off-the-shelf" units, but built to customer rotation and discharge specifications. Each one receives 100% inspection before it leaves the Peerless factory. Each unit is built to NAFM standards. Motors are built to NEMA standards. Each unit is ready for operation when received at the installation site.

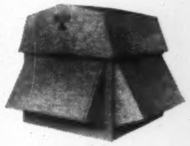
A COMPLETE LINE OF AIR MOVING EQUIPMENT











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FAN AND BLOWER DIVISION

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Write Today for Bulletins SDA-220, SDA-200 and SDA-160.

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T & B

FOR

AIR CONDITIONING, HEATING, and VENTILATING

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CEILING DIFFUSERS
HIGH PRESSURE DIFFUSER UNITS
GRILLES and REGISTERS
CONVECTORS
BASEBOARD

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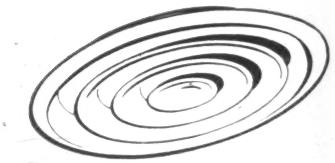
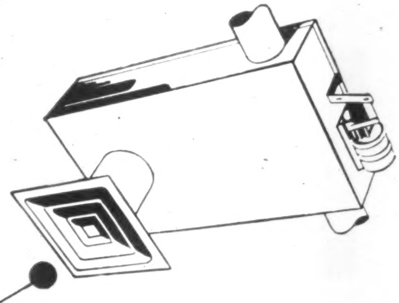
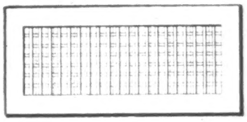


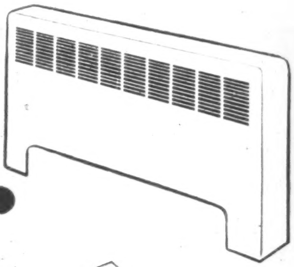
Aerofuse Ceiling Diffusers are available in a wide selection of types and sizes, styled and engineered to meet the most rigid requirements of appearance and performance at the point of air delivery.



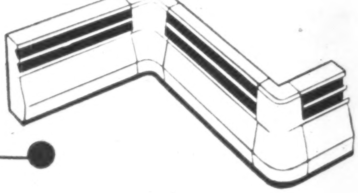
T & B High Pressure Diffuser Units are the result of many years of laboratory experiment and practical experience in the field. Units now in operation handle branch duct velocities up to 4000 FPM, discharge air without noise or drafts.



Tri-Flex Supply Air Grilles and Registers . . .
Aerovane Return Air Grilles and Registers.
Standard sizes for economy and prompt delivery. Individually adjustable face bars. Registers equipped with opposed blade dampers.



T & B Convectors are widely used in homes and apartments. Two types are available . . . Type R for recessed installation . . . Type F for free standing installation. Styled for beauty, engineered for comfort.



T & B Baseboard combines the heating comfort and smart appearance essential in the modern home. Two types . . . recessed . . . free standing . . . both designed for ease of installation.

See the
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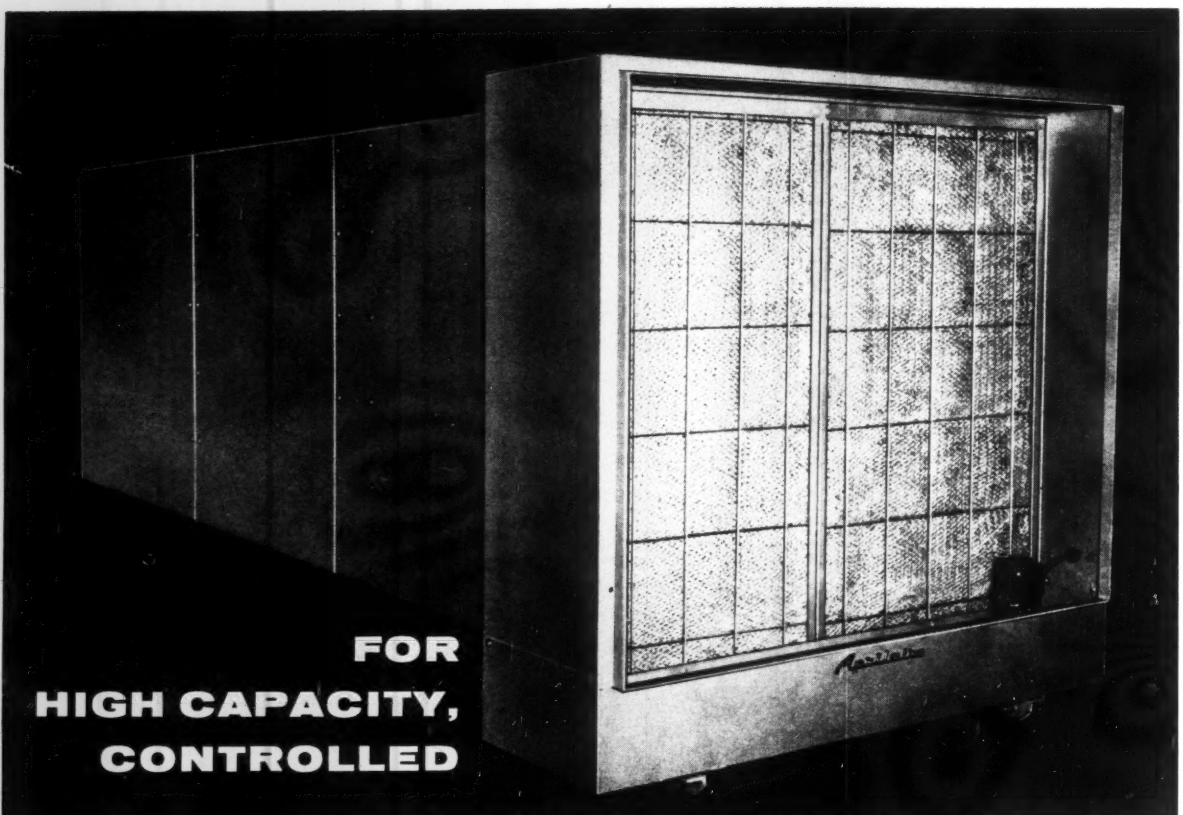
EXHIBIT
ASHAE Show, Booth 654

TUTTLE & BAILEY

T & B ®

division of Allied Thermal Corp.
New Britain, Connecticut



FOR HIGH CAPACITY, CONTROLLED HUMIDIFICATION

RP *Aprilaire*

AUTOMATIC-ELECTRIC HUMIDIFIERS

HIGH CAPACITY

Aprilaire Industrial Humidifiers (illustrated) are designed to provide capacity for practically any size requirements. Unit sizes up to 10 G.P.H.—can be installed singly or in a series of any number of units.

POSITIVE CONTROL

The Aprilaire introduces relative humidity as needed ...and only when needed. Automatic control eliminates possibility of lag or over-run.

FLEXIBILITY

Aprilaire industrial models are available for gas, steam or hot water heat source. Every model can be pedestal-mounted or suspended—according to individual requirements.

BACTERIA REMOVAL

The Aprilaire's entirely new principle of humidification, introducing humidity as a water vapor, provides an important plus feature—the removal of up to 70% of all bacteria in the air stream circulating through the unit.

ISOTHERMAL OPERATION

The Industrial Aprilaire has no temperature effect on the humidified air. Exhausted, humidified air is discharged at the same temperature it enters the unit.

MINIMUM MAINTENANCE

Because the only liming or water solids deposits occur on the inexpensive, replaceable evaporating pads... mechanical difficulties from these usually troublesome deposits are eliminated.

INDUSTRIAL AND RESIDENTIAL MODELS AVAILABLE-WRITE FOR COMPLETE INFORMATION

see our catalog in
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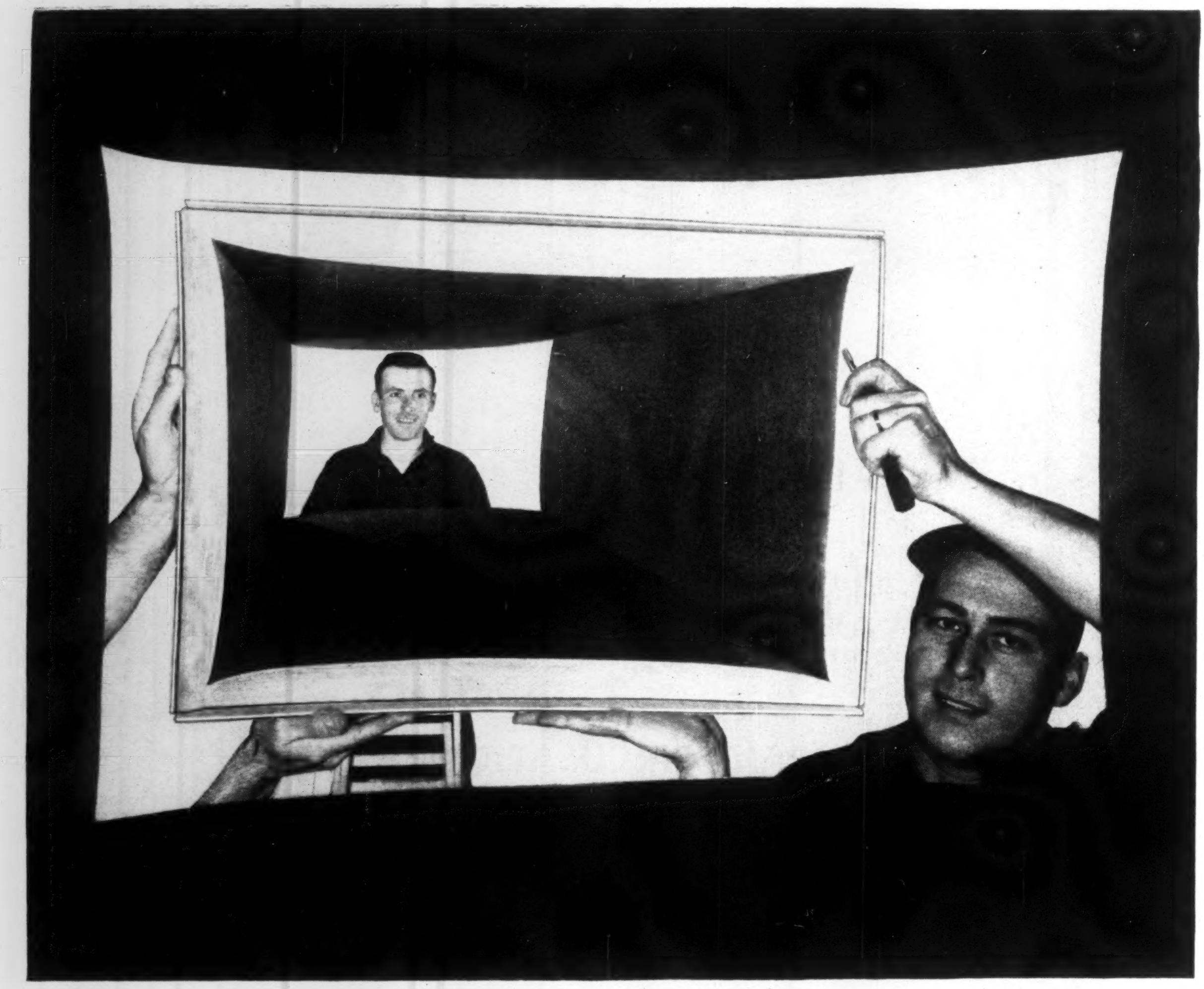

Ducts lined with L·O·F Glass Fibers' Microtex are easy to fabricate and install; offer maximum insulation per dollar.

L·O·F Glass Fibers' Microtex duct liner gives 3-way protection, even at peak air velocities

For more efficient, 3-way insulation . . . under *all* operating conditions . . . at low cost, specify L·O·F Glass Fibers' Microtex duct liner. Fine glass fibers absorb mechanical noises; insulate warm- and cold-air ducts against heat transfer. Duct itself acts as a vapor barrier. Sprayed facing resists air erosion, even at top operating velocities.

Economical Microtex provides maximum insulation per dollar. Applied quickly with adhesive and formed with the duct in the brake, Microtex requires no special skills, tools or equipment. Can be easy cut and fitted into irregular sections. Available in 1½, 2, and 3 lb. /cu. ft. densities, coated with black vinyl, Microtex is:

• strong	• fire-resistant
• permanent	• resilient
• lightweight	• pleasant to handle

Get the facts on high-efficiency, low-cost Microtex duct liner. Contact our distributor, or write: *L·O·F Glass Fibers Company, Dept. 39-27, 1810 Madison Avenue, Toledo 1, Ohio.*

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L·O·F GLASS FIBERS COMPANY • TOLEDO 1, OHIO

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Bartels

Fashion **THERMOSTAT**
by WHITE-RODGERS

. . . dramatically styled for the most important market of all . . . HOMEOWNERS

the right shape no sharp corners, severe curves or circles to clash with room or furnishings . . . ***the right color*** Adobe-Beige, harmonizes perfectly with any color scheme . . . ***smart hinged cover*** removes the "mechanical look" forever and discourages unnecessary setting changes . . . ***can be painted to disappear*** just paint the entire cover to match wall, no dials peek through . . . ***replaces outmoded thermostats*** inconspicuous adaptor plate covers any spots or plaster scars left by old-fashioned shapes.

The *Fashion* . . . biggest sales promoter the industry has ever seen . . . creating demand everywhere!

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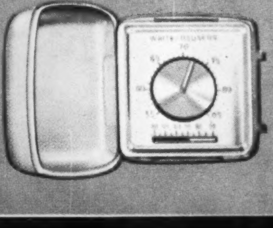

Type 120-115 for heating.

Type 121-115 for cooling.

TEMPERATURE CONTROLS for MODERN COMFORT

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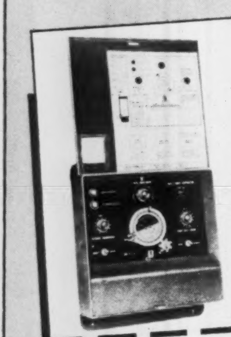
HEAT-TIMER PRECISION CONTROLS

For many years HEAT-TIMER Corporation has provided the residential, commercial and industrial heating fields with the finest in heat regulating and combustion controls. Their high efficiency and dependability has won for them universal preference by engineers and contractors wherever they are distributed.

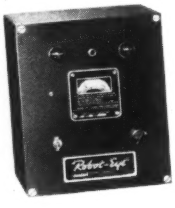
It will pay you to check the low cost and high quality of these products:



HEAT-TIMER®

Electronic Weather Actuated Heating Control

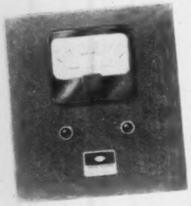
Heat-Timer Electronic Weather Actuated Heating Control automatically regulates the amount of heat supplied to a building based on outdoor temperature and on the actual heat requirements of the building. In N. Y. City over 35,000 buildings save up to 40% in fuel costs using Heat-Timer controls.



Robot-Eye®

Electronic Combustion Control

Robot-Eye is the result of many years of research and development in the control of fuel-to-air ratio, to properly maintain optimum combustion and the elimination of smoke. It is used on all types of commercial and industrial burners using BunkerC or residual fuel oil . . . with savings ranging up to 15%.



Smoke-Eye®

MODEL S INDICATING SMOKE ALARM

Designed to operate under the severe and exacting conditions of the boiler room. This low cost, efficient smoke alarm system meets all requirements of accuracy, dependability and long life.

Smoke-Eye®

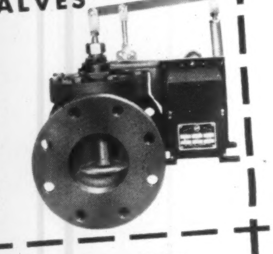
MODEL M SMOKE ALARM

A low cost, easy to install smoke alarm system featuring low installation cost and simplicity of operation. Its rugged construction and its dependability give it a quality unsurpassed by the most expensive smoke alarm systems.

MOTORIZED VALVES

For Zone Heating

Heat-Timer Motorized Valves provide the means for the control of the flow of steam or hot water. Can be actuated by any heating control, thermostat, aquastat, pressure switch, etc. Are obtainable in 30 second, 1 minute, 4 minute, and 6 minute timing.



VARIVALVE®

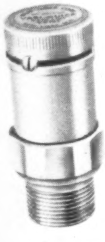
brings heat FAST to hard-to-heat radiators

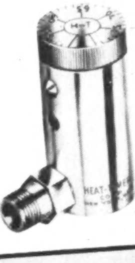
With a venting orifice that is variable up to 5/16" diameter, the VARIVALVE is the fastest venting valve available. It is the only radiator air valve made using a bellows for power. This feature insures positive closing to steam, quiet operation — no hissing or clicking . . . and, extremely long life. Made of brass . . . chrome plated. Available in angle or straight shank.

HEAT-TIMER
VARIVALVE
QUICK VENT

MAIN LINE Quick-Vent Valve

A precision constructed valve with a rugged phosphor bronze bellows to insure dependable operation and long life. Venting orifice to $1/2$" with provision for simple adjustment to meet venting requirements. Made of brass . . . chrome plated.





THERM-O-VALVE®

The Radiator Air Valve with the BUILT-IN THERMOSTAT

Control temperature room-by-room without interfering with existing controls operating the burner. Just select the temperature you desire on the dial . . . THERM-O-VALVE will do the rest . . . automatically. The room temperature will determine at the beginning of each heating cycle the venting rate, if any, of the air valve. The built-in bellows thermostat regulates the venting orifice of the THERM-O-VALVE. Available in straight or angle shank. Brass—chrome-plated.

SEE US IN CHICAGO

See actual demonstrations of these and other HEAT-TIMER Precision Controls at BOOTHS 336-338 — International Heating and Air Conditioning Exposition

ALL HEAT-TIMER PRODUCTS ARE UNCONDITIONALLY GUARANTEED

Write for complete catalog describing Heat-Timer Precision Controls

HEAT-TIMER CORPORATION
657 BROADWAY — NEW YORK 12, N. Y. — ALgonquin 4-5380

This is a Buensod Dual-Duct air mixing unit. More than two-thousand like it have been installed to provide *ultra-flexible* air conditioning in New York's Rockefeller Center. Many thousands have been installed elsewhere. *But the important news is this: now*

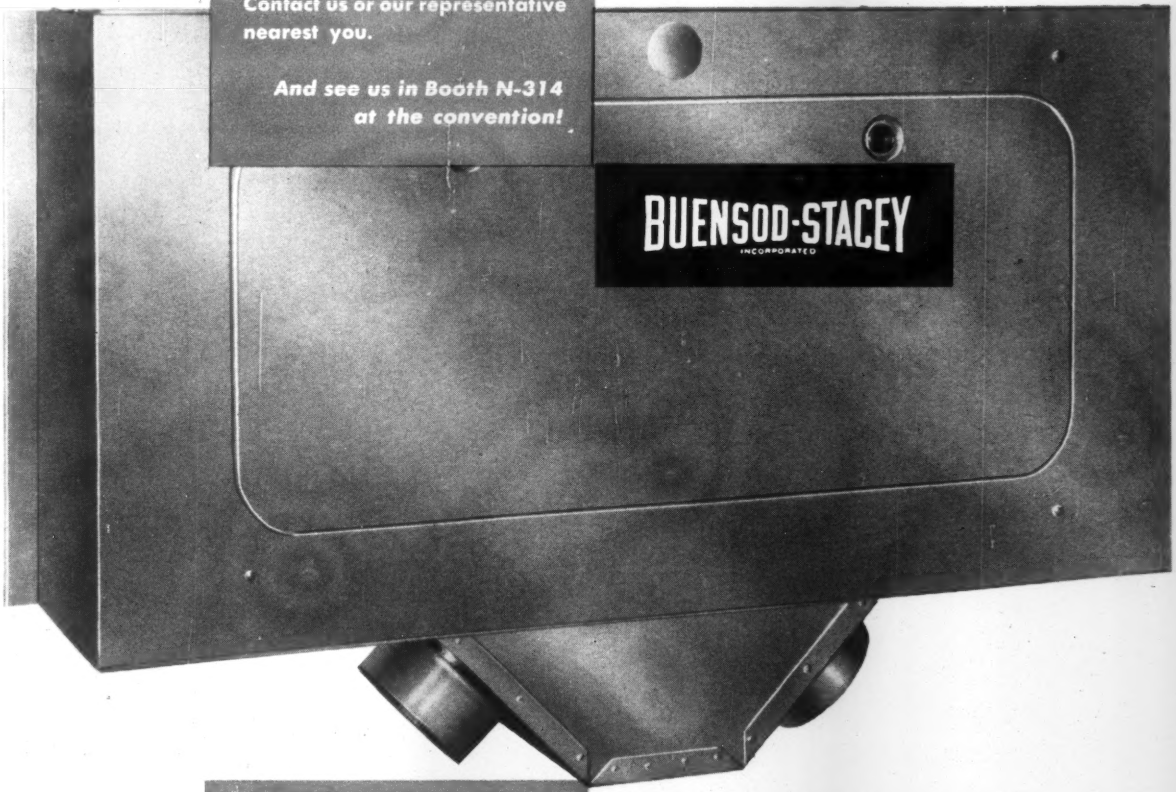
DUAL-DUCT

UNITS ARE AVAILABLE MADE OF

ALUMINUM

—inside and out. It's a Buensod first. Only Buensod makes *aluminum* air mixing units. Light. Corrosion-resistant. The obvious choice for *your* next project. Contact us or our representative nearest you.

And see us in Booth N-314 at the convention!



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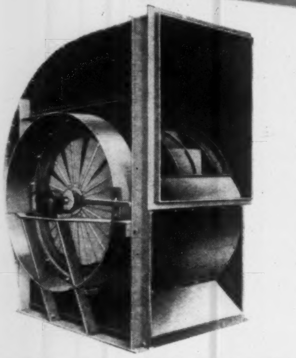
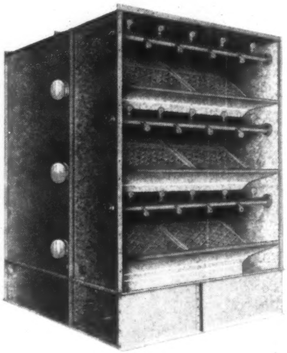
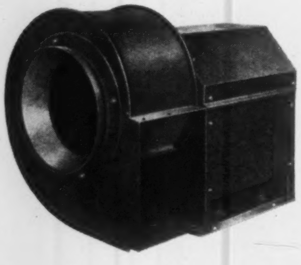


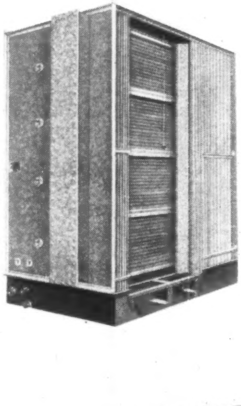
Ventilating and Air Conditioning Fans Type NH Fans (shown) with backwardly inclined blade wheels, capacities 1,000 to 725,000 cfm. Catalog 221. Type HV Fans with forward curved multiblade wheels, capacities 150 to 450,000 cfm. Bulletin 200.



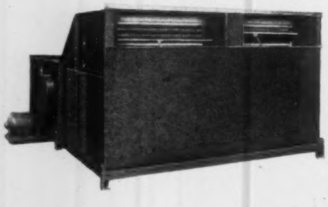
Air Washers Capillary (shown) and Spray Type Air Washers for air cleaning and purification. Catalog 405 for Capillary type; Catalog 400 for Spray type.



Ready Unit Ventilating Sets Complete, ready-to-run units for smaller air handling requirements. Catalog 515. Direct connected and V-belt models in 18 sizes, capacities 100 to 14,000 cfm. Bulletin 500.



Sprayed Coil Units Uni-coil Units designed principally for cooling and dehumidifying service in central station air conditioning systems. Catalog 411.

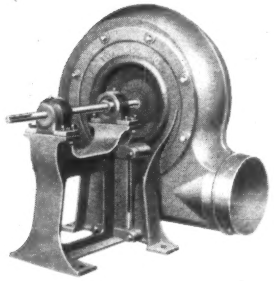


Air Conditioning Units Blow-Thru Multitherms (shown) for zone control. Bulletin 1310. Draw-Thru Multitherms for comfort and process applications. Catalog 1307. Hi-Static (Bulletin 1312) and Sprayed Coil Multitherms also available. Capillary Conditioners for exceptional air cleaning. Catalog 1351.

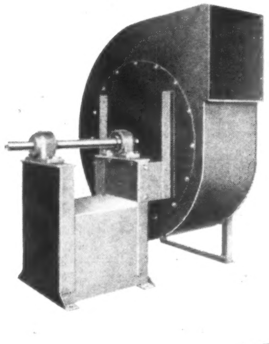
CFCo

CLARAGE FAN COMPANY

dependable equipment for making air your servant



Industrial Exhausters and Blowers Type CI Exhausters (shown) with capacities 200 to 3,800 cfm, pressures to 22". Catalog 705. Type O Blowers with capacities 150 to 45,000 cfm for higher pressures. Bulletin 850.

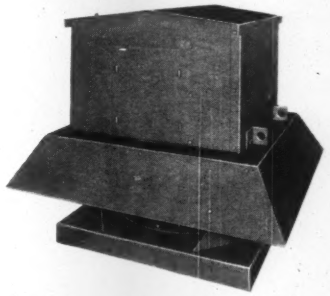


Industrial Air and Material Handling Fans Type XL Fans range up to 130,000 cfm, 18" SP, 60" inlet diameter. Four wheel types, 16 fan sizes—smaller sizes adjustable as to discharge. Bulletin 702.

NEW

See it at the Show

Booth 817 - 821



Introducing . . . the new Clarage Centrilator, a centrifugal type Power Roof Ventilator, with an exclusive Clarage Jet Siphon feature for quiet performance, high efficiency. Self-contained, exceptionally rugged, low silhouette, economical in all respects. Ten standard sizes with capacities to 26,400 cfm. Request Bulletin 550.

The Clarage line also includes Unitherm Unit Heaters with multiblade fans . . . Clarco Unit Heaters with propeller fans . . . Unit Stoker Fans in a wide size range . . . Propeller Fans with capacities 700 to 36,000 cfm . . . Vortex Control for efficient, economical air volume regulation . . . Mechanical Draft Fans. By specializing — building air handling and conditioning equipment *exclusively* — Clarage has a concentrated "know-how" that means important dividends for you.

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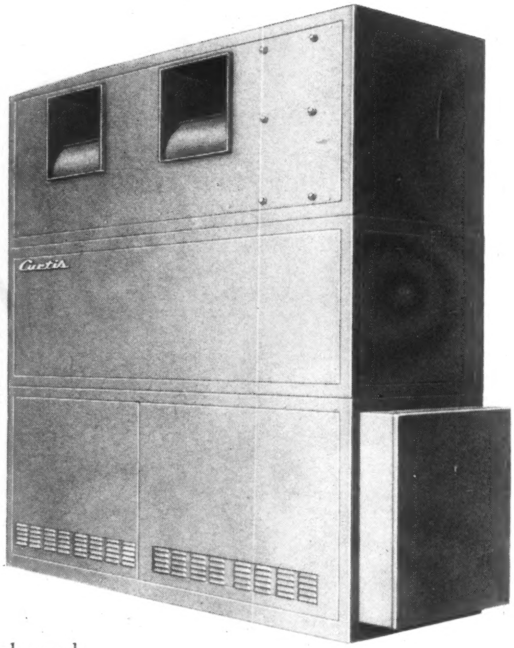
NOW!

Curtis

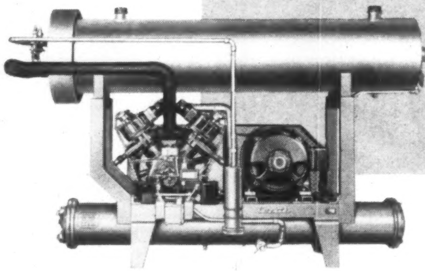
PACKAGED UNITS
Up to 50 Tons
OPENS NEW MARKETS FOR PACKAGED AIR CONDITIONING



No question about it. The new 50-ton Curtis packaged air conditioner will open a new sales front for you. Architects, engineers *and* owners prefer packaged units for important reasons:

- Big package units are line assembled—does away with expense of field labor. Assures a BALANCED SYSTEM.
- Packaged units are easier to install—take up less space.
- Cuts down installation problems and maintenance costs.

IMPROVED PACKAGED LIQUID CHILLER... FOR WET HEAT SYSTEMS



up to 100 tons—

With all controls in single panel box for easier access and greater protection! Four step capacity control—unloaded starting available. Particularly desirable where year 'round conditioning of multiple individual rooms is required.

REMEMBER, every Curtis unit is backed by a solid 103 years of experience and skill. Curtis offers a complete line of air conditioning equipment—nationally advertised to help you sell.

CAN COUNT ON
REMEMBER...
YOU

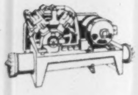
Curtis

OUR 103rd YEAR

MANUFACTURING COMPANY
REFRIGERATION DIVISION
1950 Kienlen Ave. St. Louis 20, Mo.

CM-16

New Curtis Packaged, Air Cooled, Air Conditioning Units, 3 thru 7½ tons. Residential and commercial applications.



Condensing Units up to 100 tons. F-12 or F-22.

Air Handling Units, Cooling Towers and Evaporative Condensers to match.

See these new Curtis units at the International Heating and Air Conditioning Exposition, Amphitheatre, Chicago, February 25 to March 1. Booth numbers 748, 750, 849 and 851.

SKIDMORE PUMPS set the pace in performance*

Featuring—mechanical shaft seal

dependable performance

quiet operation

NEW BULLETIN NO. 21-B

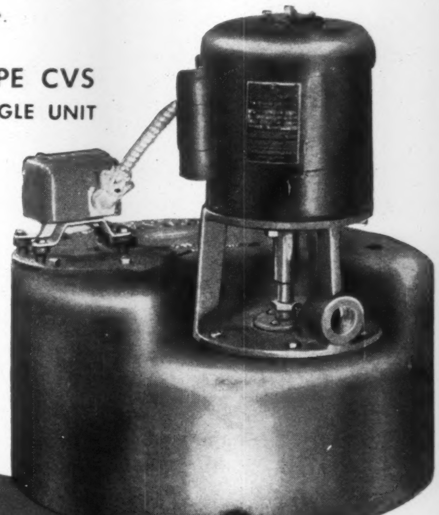
send for your copy

Make sure you get all the advantages when you buy or specify heating pumps. The new SKIDMORE type CVS condensate pump offers the very last word in pump engineering—*Mechanical shaft seal . . . greater range of discharge pressures. Compact design . . . lightweight construction . . . quiet operation and dependable performance.*

TYPE CVS
DUPLEX UNIT

For heavy duty service specify a SKIDMORE CVS duplex unit. Above is shown pump with two floats and switches. Unit is also furnished with one float and mechanical automatic alternator to provide alternating operation of two pumps.

TYPE CVS
SINGLE UNIT

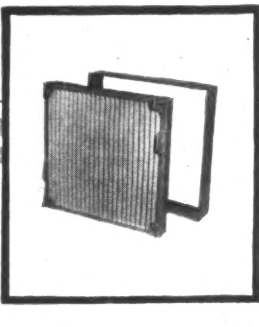


Here are the answers to— your Heating Pump Problems

*SKIDMORE PUMPS have set a standard for performance and dependability since 1921

SKIDMORE CORPORATION
ST. JOSEPH, MICHIGAN

KEEP IT CLEAN... by Phil Tration



Filtering "sound and fury," as shown in the cartoon, is what Walt Disney would call a *plausible impossible* use for Dollinger Filters. In industry today, however, practically any gas, liquid, or air *can* be handled more efficiently with Staynew Filters. They protect machines or processes, or workers from the damage caused by dust, dirt, oil, grease, or other foreign matter. In thousands of industrial and ventilating applications throughout the world, Staynew Filters have become recognized as the highest standard of quality available.

DRY PANEL VENTILATION FILTER

The Dollinger Dry Panel Filter operates with any filtering material that comes in sheet form and can be crimped. Preformed filtering elements are available for quick and easy replacement when necessary.

Whatever your filtering problems, wherever you are, there's a Dollinger representative ready to help you solve it . . . write today and ask for ventilating filter catalogs, Dollinger Corporation, 9 Centre Park, Rochester 3, N. Y.

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STAYNEW **DOLLINGER**

FILTERS

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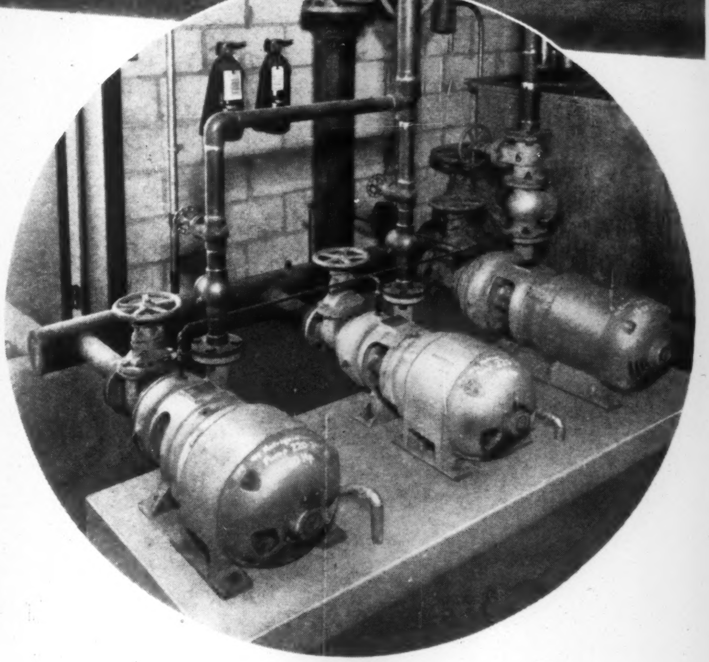
another new supermarket another MOTOR PUMP installation...

PENN
FRUIT
penn fruit co.
AIR CONDITIONED
BAUSE DRUGS



Dependable and economical Ingersoll-Rand Motorpumps help assure operation of the New Supermarket's 100 ton air conditioning system.

Air conditioning architects, engineers and contractors who know the importance of customer satisfaction, are depending more and more on Ingersoll-Rand Motorpumps for care-free, trouble-free service.

Advanced features and rugged construction of I-R Motorpumps for air conditioning have meant an end to costly breakdowns. Low-cost operation and ease of installation make them the natural choice for air conditioning systems.

For additional information contact your nearby Ingersoll-Rand representative or write for data to Ingersoll-Rand Cameron Pump Div., 11 Broadway, New York 4, N. Y.

Features like these set the pace with years-ahead performance:

- **Compact, space-saving**
- **Operate in any position**
- **Simple installation**
- **Sizes up to 75 hp**

Ingersoll-Rand

2-419

Cameron Pump Division
11 Broadway, New York 4, N. Y.

PUMPS • COMPRESORS • TURBO-BLOWERS • VACUUM EQUIPMENT • ROCK DRILLS
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The Standard of Comparison

FOR THE HEATING INDUSTRY

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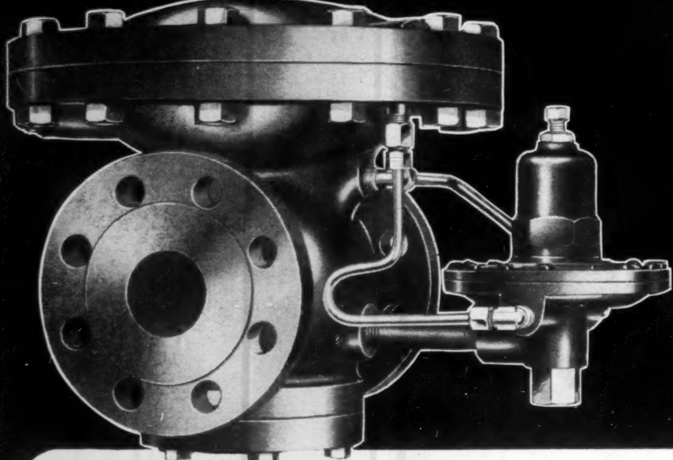
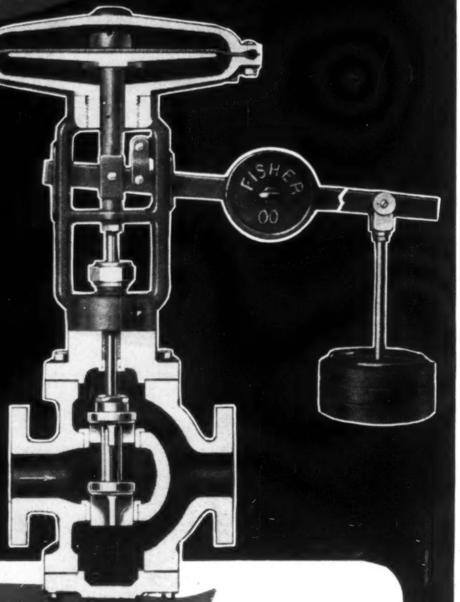


TYPE 92A



TYPE 10A

PILOT OPERATED PRESSURE REDUCING VALVE

Built for long dependable service for steam pressure control. The 92A features single seated hardened stainless steel construction, assuring tight closure and preventing excessive pressure build-up. Pilot control maintains desired reduced pressure with remarkable accuracy. Two pilot assemblies for high or low pressure are available and interchangeable.

Sizes ½" to 2" screwed; 1" to 6" flanged. Reduced pressure ranges 3 to 200 PSI. Inlet pressures to 250 PSI at 450°.

LEVER and WEIGHT CONTROLLED PRESSURE REDUCING VALVE

An extremely sensitive, simple yet rugged controller for reducing steam or gas pressures. Double ported globe bodies can be inverted to allow conversion to a relief valve. Swing-link yoke and balanced lever construction permits installation with diaphragm either above or below pipeline.

Sizes ½" to 2" screwed; 1" to 10" flanged. Reduced pressure ranges ½ to 100 PSI. Inlet pressures to 600 PSI at 800° or 1200 PSI at 100°. Bronze or stainless steel trim.

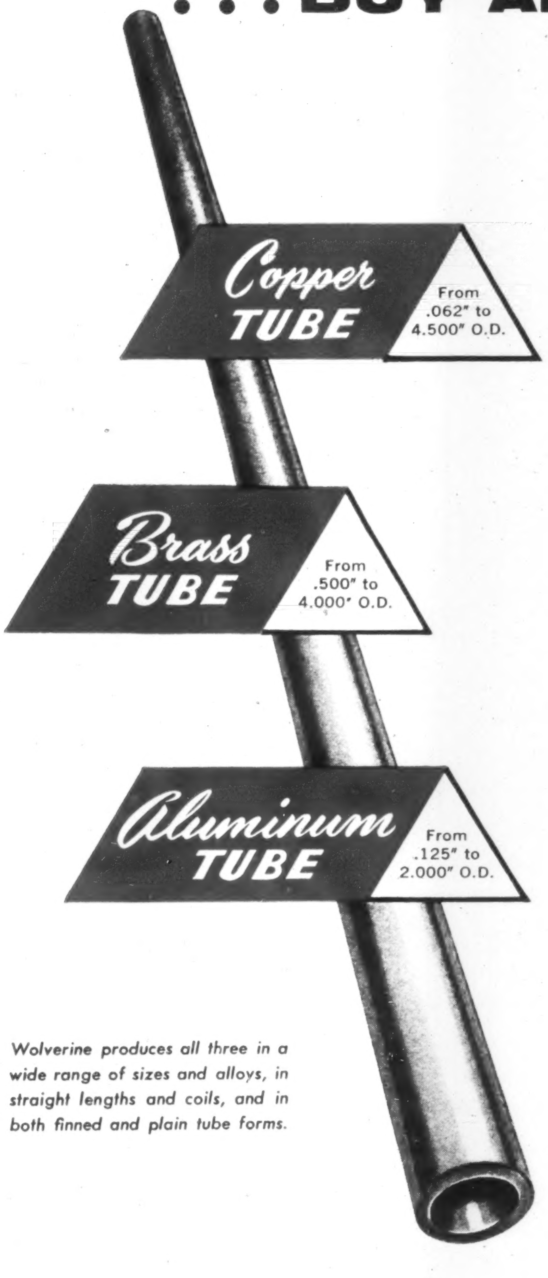
FISHER

FISHER GOVERNOR COMPANY • MARSHALLTOWN, IOWA

WORLD LEADER IN THE MANUFACTURE OF PRESSURE REGULATORS AND IN RESEARCH FOR BETTER PRESSURE CONTROL

Since 1880

. . . BUY ALL 3 FROM 1


Copper
TUBE
From .062" to 4.500" O.D.
Brass
TUBE
From .500" to 4.000" O.D.
Aluminum
TUBE
From .125" to 2.000" O.D.

Wolverine produces all three in a wide range of sizes and alloys, in straight lengths and coils, and in both finned and plain tube forms.

When you're in the market for copper, brass or aluminum tube you can save time by making Wolverine your "buy" word. You obtain the product you need—made the way you want it—packaged to your exact requirements—and delivered when you want it.

Anticipating customer demands, and having the equipment, know-how and skilled employees needed to meet those demands, are all part of Wolverine's Tubemanship program. Wolverine customers can avail themselves of a wide range of specialized services in addition to various types of tubing.

Wolverine, for example, maintains complete fabrication facilities—is able to fin, spin, bend, coil, flare, expand, bead, drill, pierce—in short to do just about anything tubing customers require. From Wolverine's constant research program has come tubing specially designed to help solve the problems of such complex industries as refining, petro-chemical and petroleum processing, refrigeration and air conditioning—to name but a few.

▲ ▲ ▲

For your convenience Wolverine maintains sales offices in 33 American cities. Complete information can be found in Wolverine's General Products Catalog. Write for your copy—TODAY.

National Electrical Week
February 10-16, 1957

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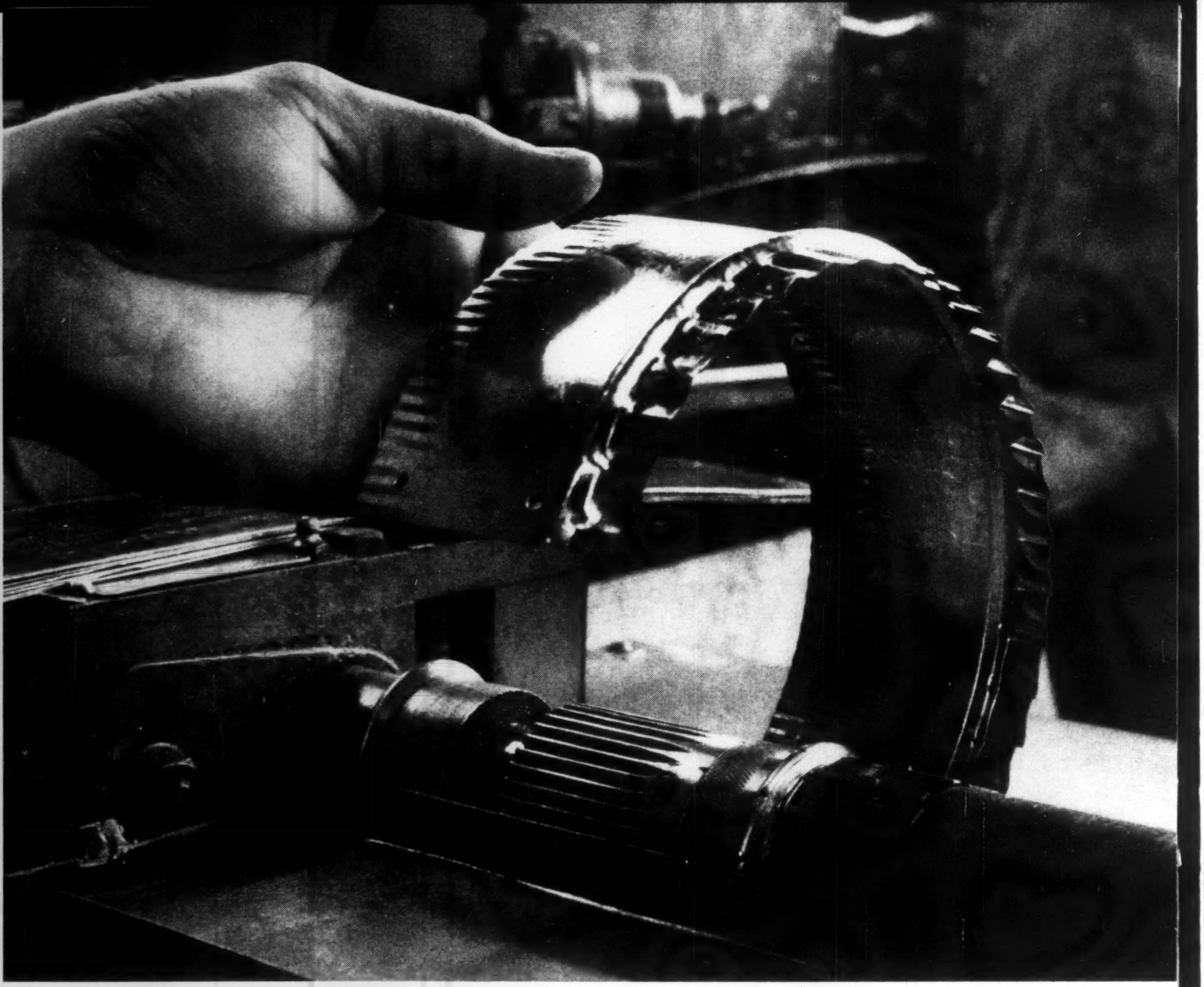

"WE USE WEIRKOTE® ONLY— ITS ZINC COATING IS FOR KEEPS!"

You come across that thought a lot when you talk with users of Weirkote zinc-coated steel.

Ask *why* they're so sold and you hear that Weirkote gives a better job at *lower* cost. Weirkote fabricates easily. Takes the toughest crimping, bending, twisting, lock seaming, the deepest draws. Its tight zinc coating stays on for keeps.

Weirkote zinc-coated steel mounts fast because it's rigid. Takes a lot of kicking around on the building site without damage. Makes a good-looking job anyone can be proud of. And it stays that way.

Weirkote is continuous-process zinc-coated steel at its best—highly resistant to corrosion, heat and noise. Cost from sheet to finished sheet metal product is low.

Send for Weirkote Booklet

Look into Weirkote for added efficiency, economy in your operation. For free booklet, write today to Weirton Steel Company, Dept. M-3 *Weirton, West Virginia.*

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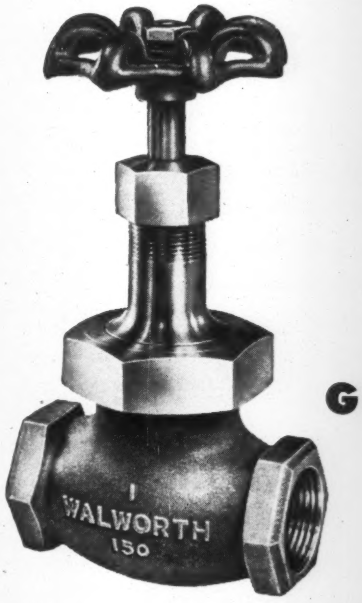
WALWORTH



IMPROVED

No. 95

BRONZE

GLOBE VALVE

also available in Angle Type (No. 96)

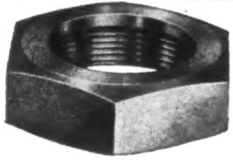
The service ratings of the Walworth No. 95 are 150 pounds per square inch steam at 500F, and 300 pounds per square inch non-shock cold water, oil, and gas. In the manufacture of this quality bronze valve, more than 47 gages are used in machining parts to micrometric accuracy, thus insuring interchangeability of parts. For further information see your local Walworth distributor, or write: Walworth Company, 60 East 42nd St., New York 17, N. Y.

note these 7 Great Features

Toothed Lock Washer: Prevents loss of stem nut due to vibration, thereby holding the handwheel securely.

Newly Designed Handwheel: Air-cooled, finger grip handwheel affords sure grip even with greasy gloves.

Improved Packing: Molded packing of lubricated asbestos reinforced with copper wire. Suitable for practically every service. Valves can be repacked under pressure.



Hexagonal Union Bonnet Connection: Eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and assembled.

WALWORTH

valves and fittings

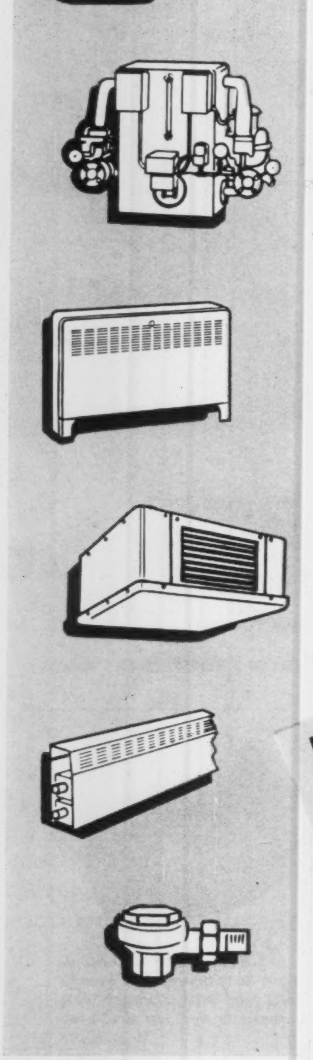
60 EAST 42nd STREET NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

New Cylindrical Disc Holder: The design of the top portion of the disc holder keeps the disc accurately guided under all operating conditions.

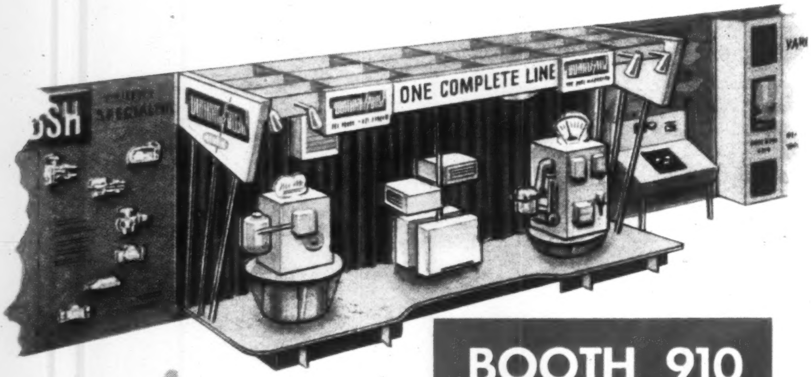
Renewable Asbestos Disc: This disc is suitable for steam up to 500F and is resistant to oil, gasoline, and many chemicals at atmospheric temperatures. Discs for special services are available.

Extra Strong Body: Made of Composition M (ASTM B61) bronze thick enough to provide a high safety factor. Valves undergo hydrostatic shell test of 450 psi.



Save Time...

YOU'VE SEEN THE SHOW



BOOTH 910

DON'T MISS Dunham-Bush HEATING HEADQUARTERS AT BOOTH 910. Talk with America's top heating engineers. See the latest in Unit Heaters . . . Pumps . . . Vari-Vac Control Systems . . . Steam Specialties . . . Hot Water Specialties . . . Convectors . . . Baseboard Radiation . . . Finned Pipe Radiation . . . Vari-Air School Systems . . . Remote Type Heating-Cooling Units.

IT'S OUR FIRST SHOW AS DUNHAM-BUSH

You've seen both of these famous concerns at previous Shows. Recent consolidation makes possible one complete air conditioning and heating line . . . "close-to-source" supply for faster delivery, lower freight rates . . . expanded engineering and research facilities. One Source . . . One Responsibility . . . Dunham-Bush!

Save Shoe Leather

WHEN YOU'VE SEEN THE

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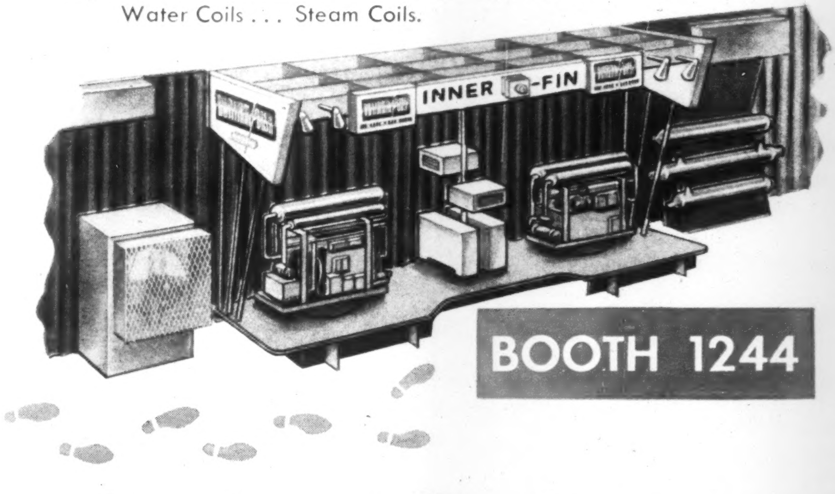
Complete Line

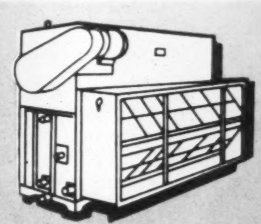
of AIR CONDITIONING AND HEATING PRODUCTS

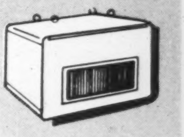
It pays to deal with a single source—single responsibility! Whether you're "shopping" the show, or ordering air conditioning and heating equipment, you're time and money ahead with Dunham-Bush. Remember, Dunham-Bush offers you a *complete air conditioning and heating line.* "One Order Does It".

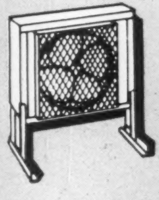
DON'T MISS Dunham-Bush AIR CONDITIONING HEADQUARTERS AT BOOTH 1244–48–50. Talk with America's top air conditioning engineers. See the latest in Air Handling Units . . . Multizone Units . . . Comfort Conditioners . . . Blower Condensers . . . Cooling Towers . . . Evaporative Condensers . . . Direct Expansion Coils . . . Water Coils . . . Steam Coils.

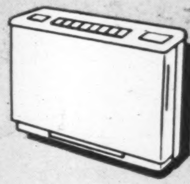


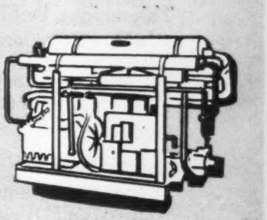
BOOTH 1244

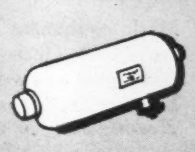












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WEST HARTFORD 10 • CONNECTICUT • U. S. A.

Air Conditioning, Refrigeration, Heating Products and Accessories

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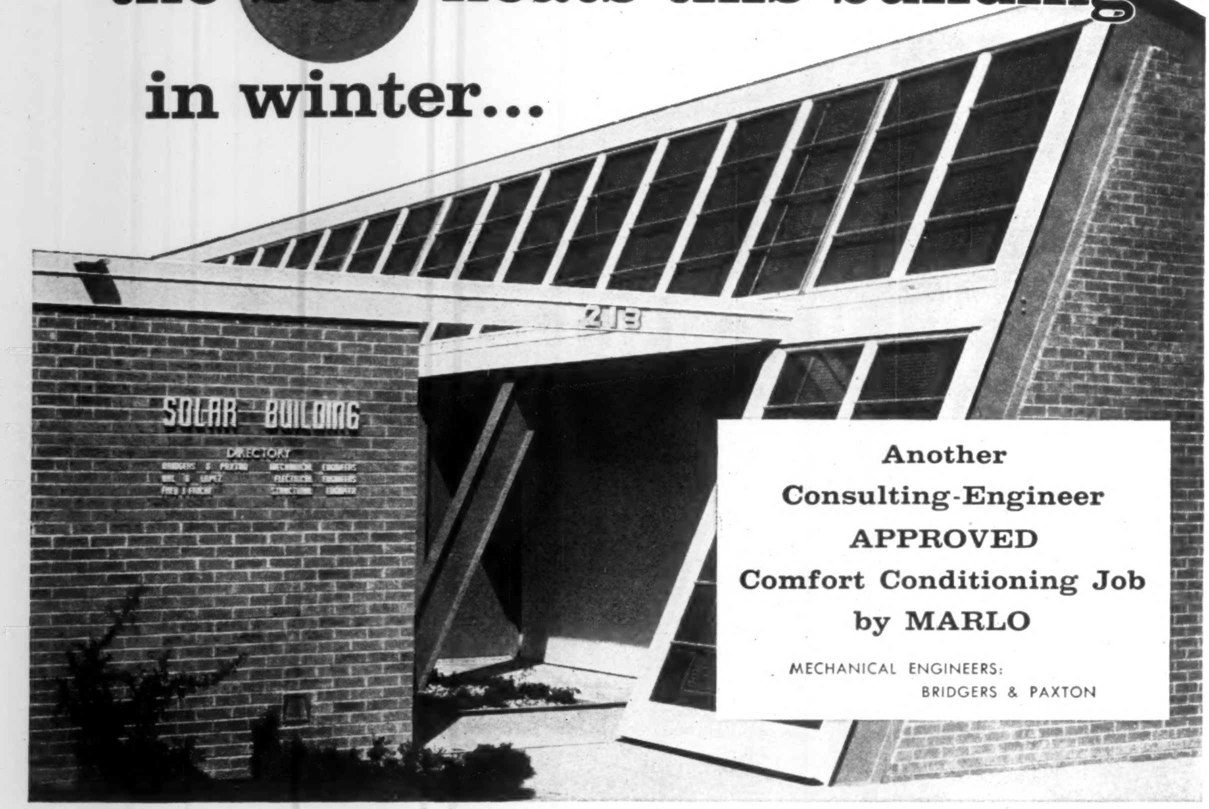
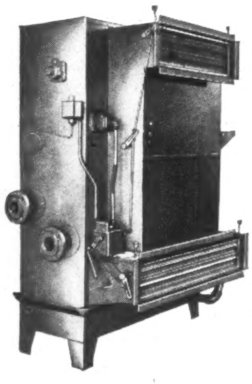
the SUN heats this building in winter...



Another Consulting-Engineer APPROVED Comfort Conditioning Job by MARLO

MECHANICAL ENGINEERS:
BRIDGERS & PAXTON

MARLO helps cool it in summer



This unique building in Albuquerque, N. M., is believed to be the first solar-heated commercial building in the United States.

Marlo heat transfer equipment is an important part of this installation which combines solar heating, evaporative cooling and an auxiliary heat pump.

Occupants of this unusual building include its owners and designers, the mechanical engineering firm of Bridgers & Paxton. Architects were Stanley and Wright, general contractor was Paul Priest. All are of Albuquerque.

Marlo equipment has played an important role in many distinctive air conditioning installations in this country and abroad. To learn how it can serve your needs efficiently and dependably, write us today.
See Our Display at Booth 1207,
Heating and Air Conditioning Exposition

MARLO coil co.

SAINT LOUIS 10, MISSOURI

Quality Air Conditioning and Heat Transfer Equipment Since 1925

THE NEW *Airtherm* AIR CONDITIONING UNIT

COMBINES THE BEST TIME-PROVED FEATURES IN THE INDUSTRY

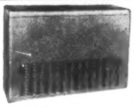
FOR NEW OR EXISTING

- ✓ OFFICES
- ✓ MOTELS
- ✓ HOTELS
- ✓ APARTMENTS
- ✓ INSTITUTIONS
- ✓ PUBLIC BUILDINGS

Here is Airtherm's answer to the demand for remote air conditioning without expensive ductwork. Features that have performed best in actual usage through the years are combined in this unit to give: (1) Maximum efficiency and operating life; (2) Quiet operation; (3) Versatility of installation; (4) Attractive appearance that blends with new or old buildings.

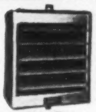
Airtherm units are made in four series from ½ to 2 ton nominal cooling capacity for cabinet or concealed installation, floor or ceiling.

AIRTHERM HEATING AND VENTILATING PRODUCTS

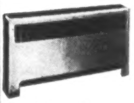


Cabinet Unit Heater

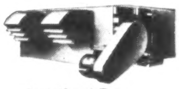
Gas Fired Unit Heater



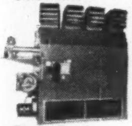
Propeller Fan Unit Heater



Convectior



Centrifugal Fan Unit Heater



Direct Fired Space Heater

MAIL COUPON FOR DETAILS

Airtherm Manufacturing Co., Dept. A
700 S. Spring • St. Louis 3, Mo.

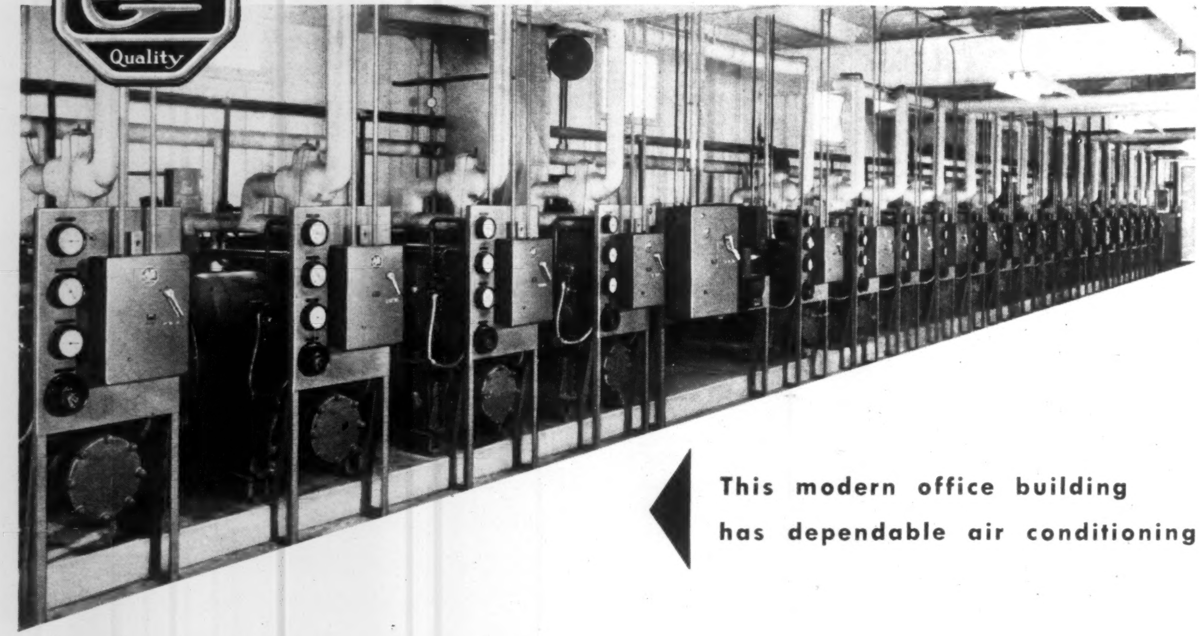
Please send specifications on the following products as checked ☐ Airtherm Air Conditioning Units ☐ Cabinet Unit Heaters ☐ Convectors ☐ Gas Fired Unit Heaters ☐ Propeller Fan Unit Heaters ☐ Centrifugal Fan Unit Heaters ☐ Direct Fired Space Heaters.

NAME ....FIRM ....

STREET ADDRESS .... CITY .... STATE ....

A-B
Quality

THE SIGN OF QUALITY MOTOR CONTROL

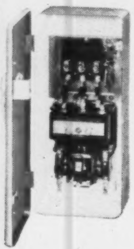


This modern office building has dependable air conditioning

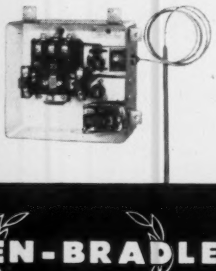
TYPICAL ALLEN-BRADLEY CONTROL UNITS FOR AIR CONDITIONING & REFRIGERATION

Bulletin 712 Combination Starter

with new visible contact disconnect switch.



Temperature Control Panel



. . . all compressors are equipped with

ALLEN-BRADLEY

TROUBLE FREE MOTOR CONTROLS

The importance of "trouble free" operation is well recognized by air-conditioning and refrigeration equipment manufacturers. This is illustrated in the above picture which shows 20 of 41 air-conditioning compressors installed in a new office building . . . all equipped with Allen-Bradley controls.

The basic simplicity of Allen-Bradley solenoid starters is the reason for their outstanding reliability . . . there is only ONE moving part. No bearings or gimmicks to corrode and stick . . . no jumpers to break. The double break, cadmium silver alloy contacts never need cleaning, filing, or dressing . . . maintenance down time is eliminated, and so are "service calls." Dependable overload relays that maintain their accuracy indefinitely protect motors against burnout.

Specify Allen-Bradley "Quality" motor control . . . you will never have reason to regret your decision. Please write for your copy of the latest Allen-Bradley Handy Catalog, the 132-page guide to trouble free a-c and d-c motor control.

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

Allen-Bradley Co.
1335 S. First St., Milwaukee 4, Wis.
In Canada—
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GENERAL CHEMICAL DIVISION
DICHLORODIFLUOROMETHANE · NON FLAMMABLE LIQUEFIED GAS

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Always Insist on genetron®

Super-Dry Refrigerants

By Name as well as Number"

. . . and you're sure of top performance—because Genetron refrigerants are *super-dry!*

Carried by leading wholesalers from coast-to-coast.

When you see your wholesaler, ask for—

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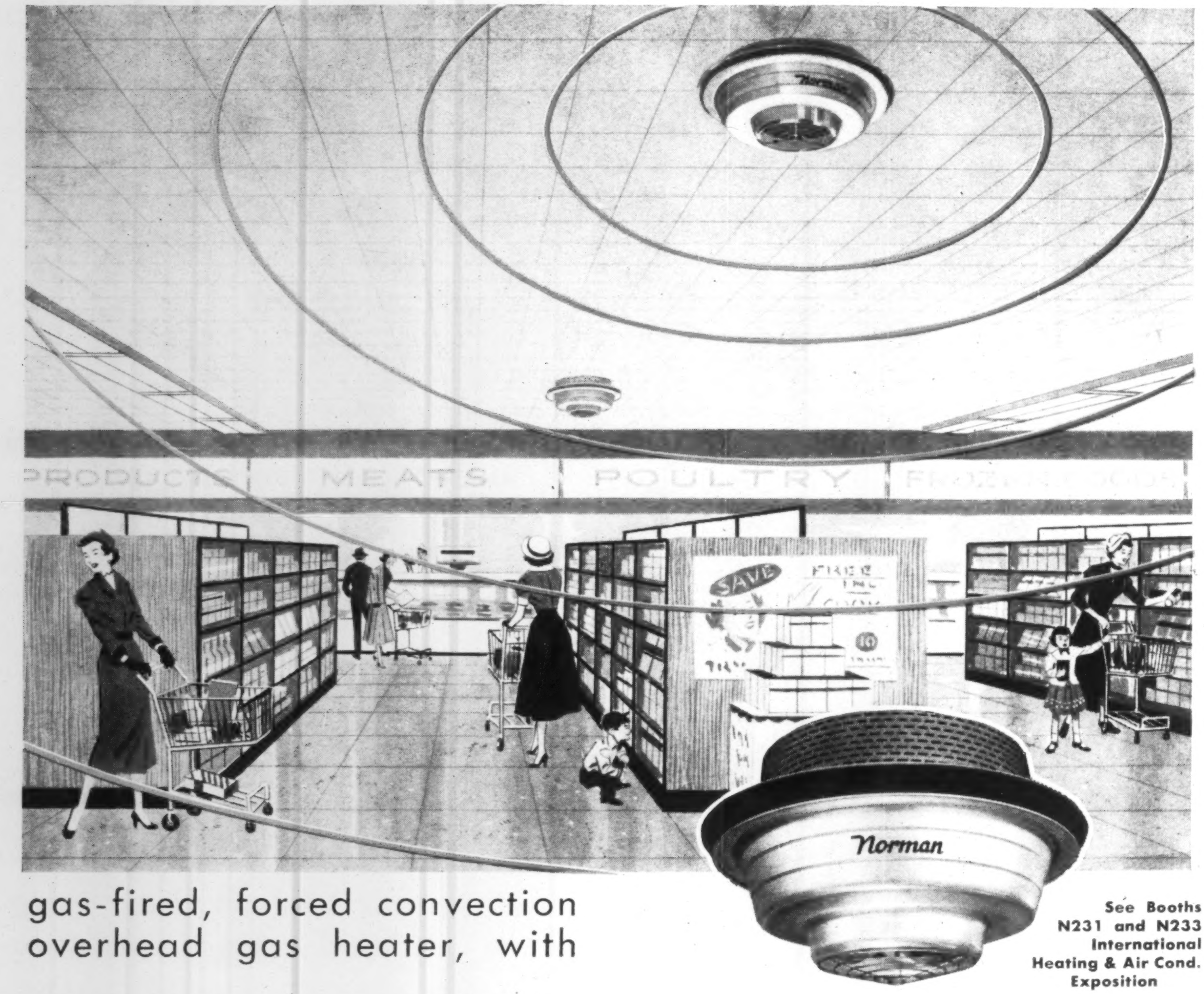
Cond. Exposition,
Feb. 25-March 1.

GC
Allied Chemical

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

Beautiful New Norman Three-Sixty®



See Booths N231 and N233 International Heating & Air Cond. Exposition

gas-fired, forced convection overhead gas heater, with

- EXCLUSIVE ELECTRIC IGNITION
- SEALED COMBUSTION SYSTEM

The all-new Norman Three-Sixty is the greatest improvement in overhead heating in 25 years. It has more exclusive features than any product in its field. And it has more to offer in beauty, economy, safety and comfort.

This new pressurized Norman unit features a sealed combustion system completely independent of room air. Exclusive electric ignition with no open flame exposed to the room makes the Three-Sixty safe for applications where an ordinary unit heater might create a hazard.

Smartly styled, this new Norman Three-Sixty with its attractive circular spun aluminum casing makes ordinary unit heaters obsolete . . . adds a touch of luxury to the most modern stores and shoppes.

In performance, the Norman Three-Sixty is even more outstanding. It assures an umbrella of comfortable warmth gently distributed outward and slightly downward in a full 360° radius. No hot blasts or cold spots.

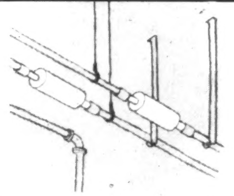
Norman Patented Sealed Combustion System

All combustion air is drawn from outside through a separate inlet pipe . . . all exhaust gases are vented to outside through a parallel separate pipe. Fully automatic electric ignition eliminates pilot flame outage. No chimney needed . . . no problem of make-up air . . . no possibility of food contamination from products of combustion . . . no humidity or dust problem.

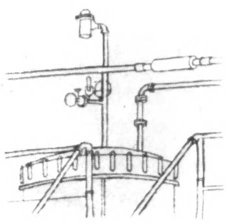
Phone, wire or mail coupon today for complete details.

NORMAN PRODUCTS CO.
1156 Chesapeake Ave., Columbus 12, Ohio
Please rush complete details and literature on the all-new Norman Three-Sixty.
NAME ______ TITLE ______
COMPANY ______
ADDRESS ______
CITY ______ ZONE ___ STATE ______

Norman products company

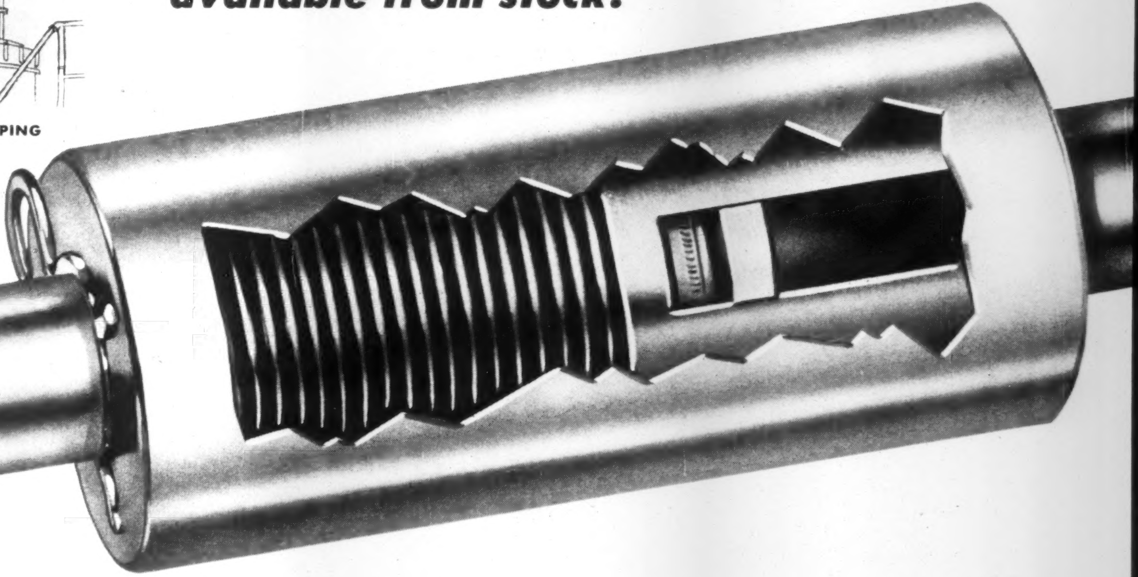


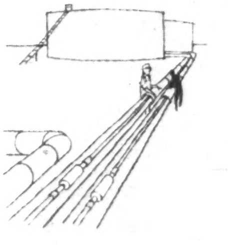
HEATING SYSTEMS



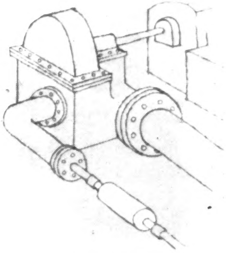
PROCESS PIPING

NOW . . . high-pressure, heavy-duty Expansion Compensator costs far less than old-fashioned methods... *available from stock!*





STEAM TRACING



POWER PIPING

Flexon®

MODEL H EXPANSION COMPENSATOR

Get delivery when you want it! Flexon Model H Expansion Compensators are available from stock. And they cost much less per inch of stroke than any other method of absorbing pipe expansion.

Flexon Model H is made to fit the thousands of industrial piping jobs that use pipe up to 3″ and require less than 1¼″ total movement. It's built for hard service, with 2-ply stainless steel Flexon Bellows, positive anti-torque and anti-squirm device, and full protection from external damage. Completely packless, it never needs maintenance. Working pressures up to 150 p.s.i. for ¾″ and 1″ sizes; up to 100 p.s.i. for larger sizes.

Write for facts about Flexon Expansion Compensator, design and cost data, and the name of your Flexon distributor.

Flexonics corporation

EXPANSION JOINT DIVISION • 1391 S. THIRD AVENUE, MAYWOOD, ILLINOIS

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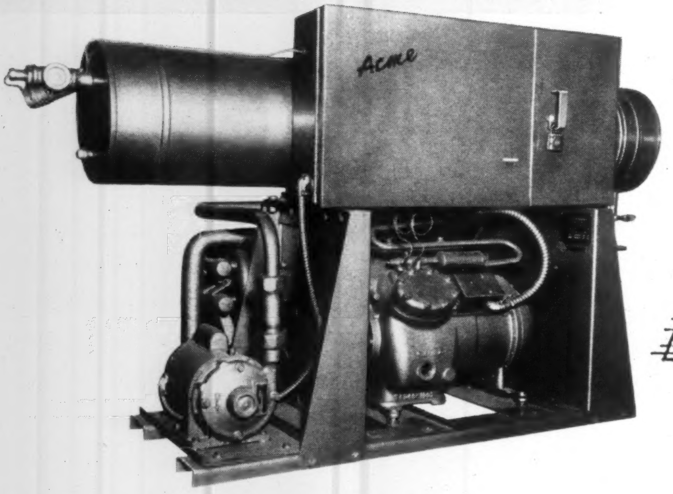
TODAY'S MOST ADVANCED SMALL TONNAGE LIQUID CHILLER!

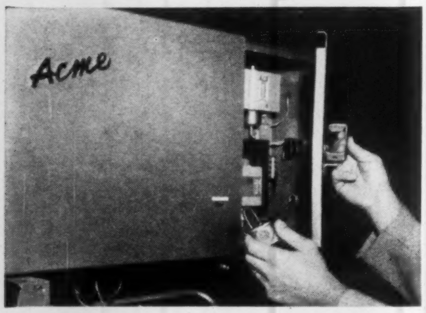


...the *Acme* FLOW COLD®

It's Flow-Cold again for '57 — the most advanced, most specified line of packaged chillers in the 3 thru 20-ton range. Whether you're an engineer requiring the best in design and construction, or a contractor looking for ease of installation and trouble-free operation, there are good reasons for heading your chiller specifications with "Acme Flow-Cold."

The Flow-Cold's components—Dry-Ex® chiller, condenser, heat exchanger and super quiet, accessible-type, hermetic compressor — are tops for advanced engineering . . . proven performers! Flow-Cold chillers are *complete* packages . . . all piping and wiring factory-installed and tested *in operation*. All necessary controls are furnished . . . now fully enclosed to stop unauthorized tampering. And Flow-Cold chillers are not only factory tested, they're *certified* . . . a "first" among chiller manufacturers.

Now add the Flow-Cold's newly streamlined wiring and piping, neat, pre-formed pipe insulation and inherent compactness of Acme's Flow-Cold design . . . and you have a chiller that's just as *good looking* in an installation as it is efficient and economical to operate.

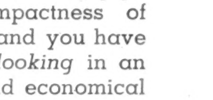


NOW TAMPER-PROOF

Ever experience the damage to a system from control "adjustments" by inexperienced personnel after a job is installed? The Flow-Cold's new enclosed box can be locked to "foil the fiddle fingers" and keep servicing in the hands of men who know how.

AND TEST-CERTIFIED

Proof of seven factory test procedures conducted under full load, Acme's Certificate of Performance guarantees every Flow-Cold's ready-to-go dependability.


Acme Industries, Inc.

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AIR CONDITIONING
REFRIGERATION

Acme INDUSTRIES INC., Jackson, Michigan

Dry-Ex Liquid Chillers
Liquid Receivers
Heat Exchangers
Condensers
Packaged Chillers
Packaged Heat Pumps
Evaporative Condensers & Cooling Towers
Room Conditioners

Manufacturers of Quality Air Conditioning and Refrigeration Equipment since 1919

A New Approach to Perfection

MAINTENANCE-FREE
LIMA MOTORS
IN ALL NEW NEMA FRAME SIZES

- 30% LESS WEIGHT PER HORSEPOWER
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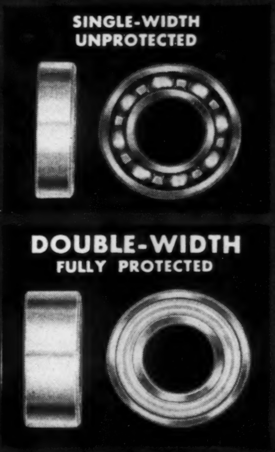
- DUAL FANS INTEGRALLY CAST WITH ROTOR
- COMPLETE ROTOR ASSEMBLIES DYNAMICALLY BALANCED
- RIGID, CAST IRON FRAMES WITH INTEGRALLY CAST FEET
- DIAGONALLY SPLIT CAST ALUMINUM CONNECTION BOXES— CADMIUM PLATED COVER SCREWS
- TOTALLY ENCLOSED FRAMES MEET J.I.C. SPECIFICATIONS

Slash maintenance costs and eliminate costly inspection and lubrication programs with Lima Motors in NEW NEMA frame sizes. With lubricated-for-life DOUBLE-WIDTH ball bearings, solid die cast aluminum rotors with dual integral fans, and Mylar insulation . . . Lima gives you higher full-load speeds with the most complete motor protection available. Install these new Finest Quality Lima Motors—and forget them.

Lima now has in production all ratings in new NEMA frame sizes 182 through 326U. Get complete details on Lima's new NEMA *maintenance-free* motors from your Lima Representative now! If he is not already calling on you, his name and address will be found in *Thomas' Register*, *MacRae's Blue Book* or *Conover-Mast Purchasing Directory*.

Of course, Lima will continue to produce regular NEMA frame sizes 66 to 505 (⅓ to 150 H.P.), incorporating the latest advances in motor design.



THE OLD WAY

Open and unprotected motor bearings subject to contamination and must be inspected and lubricated frequently.

THE LIMA WAY

Sealed and protected—Lima's DOUBLE-WIDTH pre-lubricated motor bearings require no attention—just put the motor to work and forget it.

THE LIMA ELECTRIC MOTOR COMPANY, 4991 Findlay Road Lima, Ohio

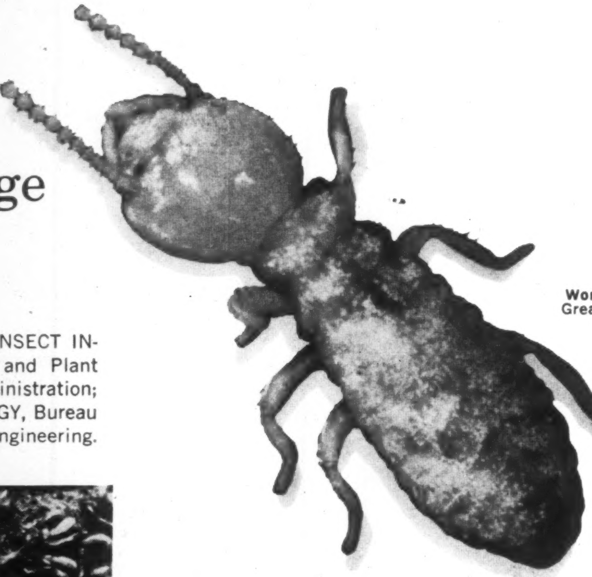
[illegible]

FIRST . . . FOR MOTORS . . . DRIVES . . . SPEED REDUCERS

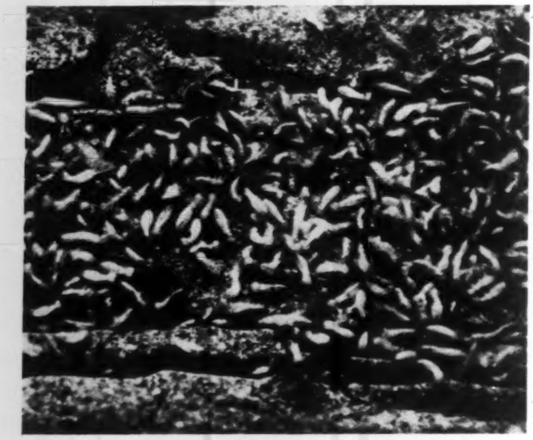
BULLETIN No. 1993

"Decay and Termite Damage in Houses"

Prepared by the DIVISION OF FOREST INSECT INVESTIGATIONS, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration; and the DIVISION OF FOREST PATHOLOGY, Bureau of Plant Industry, Soils, and Agricultural Engineering.



Worker Termite
Greatly enlarged



Worker Termites—Natural size

(Excerpts—Exact Quotation)

"TERMITES are the most destructive of the insects that attack wood in houses. They eat the interior of the wood and may cause much damage before they are detected."

"Wood damaged by termites can be easily distinguished from decayed wood. Termites honeycomb the wood with definite tunnels; these are separated by thin partitions of sound, firm wood."

"Wood decay is caused by fungi, which are plants consisting of microscopic threads . . . the decay fungi weaken or destroy the fiber. These cannot work fast at temperatures below 55 to 60°F., and *not at all in dry wood.* There is no such thing as 'dry rot'; decayed wood is often dry after it has rotted, but not while the decay is taking place."

"The decay fungi soften the wood and in the final stages cause it to shrink and crack or crumble."

Scientific multiple aluminum, by insulating against vapor and heat flow, keeps the area beyond the insulation colder and drier, thus retarding fungus growth and timber rot.

"10 Essential SAFEGUARDS AGAINST TERMITES AND DECAY"
will be found in U.S. Bulletin 1993,
obtainable free by sending the coupon.

A water-conducting fungus attacked untreated oak piers of this 5 year old house and continued to decay sills, joists, and studs to a height of 6 ft.

USDA Photographs

Infra Insulation Inc., 525 Bway., N. Y., N. Y. Dept. H-2
Manufacturers of Scientific Multiple Aluminum Insulation, which retards Fungus Growth and Timber Rot.

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The Editors' Pages

Air Conditioning Sales in 1957 Aim for $3½ Billion

. . . $5 billion in 1961

The air conditioning industry in 1957 will break all sales records for the eighth consecutive year, predicts Cloud Wampler, chairman of the board of Carrier Corp. Total retail volume, he says, will climb to $3½ billion.

A further increase in total retail sales is seen to a $5 billion level in 1961, 4 years hence. Mr. Wampler also estimates the volume for 1956 at just under $3.2 billion.

Regarding the growth in the acceptance of specific products, Mr. Wampler predicts:

Room air conditioner sales by the industry will rise from 1.6 million units retailing at $440 million in 1957 to 2,150,000 units selling for $591 million in 1961.

Packaged air to air heat pumps will show retail sales of about 10,000 installations at $30 million during the year ahead. By 1961 this will increase to 30,000 installations annually for $90 million.

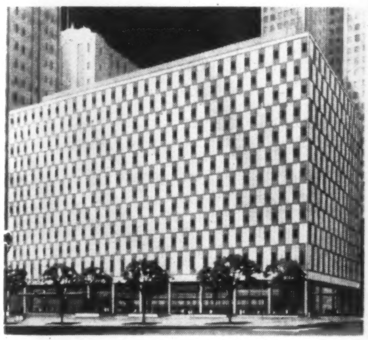
Mr. Wampler also points out a sharp upward trend in air conditioning of industrial plants, and predicts that this market is now moving toward the vast potential forecast a few years ago. In this connection he said, "Automation is one of air conditioning's best friends."

He estimates total air conditioning industry retail sales in 1957 as follows: room air conditioners, $440 million; selfcontained equipment, $238 million; residential systems, $375 million; applied or "built-up" systems, $1190 million; heating installations adaptable to air conditioning, $650 million; all other, $600 million; total, approximately $3.5 billion.

The comparable picture for 1956 was: room air conditioners, $426 million; selfcontained equipment, $215 million; residential systems, $262 million; applied systems, $1048 million; heating equipment adaptable to air conditioning, $638 million; all other, $575 million; total, approximately $3.2 billion. ‡

Mechanical Equipment To Top 12 Story Bank

. . . to feature latest concepts



Construction of the new $15 million National Bank of Detroit main office building in the heart of Detroit's financial district is expected to begin early this year, according to Charles T. Fisher, Jr., president. The new office will be 12 stories in height, rectangular in shape, and of contemporary design. The building will be completely air conditioned and the heating system will be designed in accordance with the latest methods.

The new building will occupy an entire city block. Completion and occupancy is scheduled for the spring of 1959.

There will be three floors below ground which will house "the most modern vaults in the world." The main banking floor will be at street level, with a mezzanine and 12 floors of operational space above. An additional setback story at the top will house the mechanical and air conditioning equipment. The building will contain approximately 580,000 sq ft of floor space.

The building will rise 220 ft above street level, and it will be 281 ft long by 130 ft wide. A glass facade on the east side of the main banking floor will provide an open view of the banking room from the outside. Among the unusual features will be an exterior arcade paralleling two streets.

Albert Kahn Associated Architects and Engineers, Inc., are the architects and engineers for the project. ‡

Complete Air Conditioning Set for The Conrad Hilton

. . . biggest hotel project

The biggest air conditioning project in hotel history—a $3 million installation—is scheduled for completion by September 1 this year, according to the York Corp. The Conrad Hilton in Chicago, the world's largest hotel, will then have more air conditioned rooms than any other in existence.

Two 800 hp water cooling systems will chill up to 5 million gal of water per day. To be installed within the hotel rooms are over 3300 induction air units, through which the chilled water will be pumped and circulated from the basement to the 29th floor.

The hotel has set up a completely new air conditioning department, and members of the hotel's staff have been assigned to work with the some 150 engineers and mechanics. Coordinating the project is L. E. Anderson, York's general constructon superintendent in Chicago.

The main task will be installing 95 riser systems from the attic down through the hotel to the fifth floor. Each system involves three components: a drain line, chilled-hot water supply and return lines, and a conditioned air supply duct.

The eventual construction crew will include about 60 steamfitters, 40 sheet metal workers, 20 electricians, 15 insulation installers, and six temperature control mechanics. ‡

Steel Production, Sales To Hit New Record

. . . economic factors indicate

THE STEEL INDUSTRY will make and sell more steel in 1957 than ever before in its history, according to R. L. Gray, president of Armco Steel Corp. "Almost every economic indicator points to a record year ahead," he says.

The top year for steel production was 1955, when the industry turned out 117 million tons. In 1956, the total was about 115 million tons.

Throughout 1957, and in the years ahead, the emphasis on research in the steel industry will continue to mount, Mr. Gray says. ‡

Hard Coal Comeback: Is It Solid?

. . . the industry thinks yes

THE MOST favorable year end figures for the anthracite industry since the end of World War II showed gains in 1956 in production and sales, according to the Anthracite Information Bureau.

Government and industry reports indicate total anthracite production last year at about 27,400,000 tons, up 2,274,000 from 1955. Total sales will be approximately 27,741,000 tons, an increase of 2,504,000 over the previous year.

The improvement—first upturn in hard coal's fortunes since the war—is the basis of forecasts for further gains in 1957, according to a consensus of industry leaders.

Optimism is based not only on the expanding sales of anthracite, but also on consistent increases over the past two years in the sale of automatic anthracite burning equipment.

Exports increased steadily month by month through the year and currently are running at a rate more than three times the 1955 total of 700,000 tons.

The increase in retail anthracite sales for space heating—the fuel's principal market—is attributed to an increased use of this new equipment which is running 250 percent ahead of the 1953 sales. ‡

Plastic Pipe Problems Being Unkinked

. . . use seen mushrooming

THE PLASTIC PIPE industry, which came into prominence back in 1948 and boomed into more than a $55 million market in 1956, can mushroom into a tremendous $250 million project within the next decade, according to William T. Cruse, executive vice president of The Society of the Plastics Industry, Inc.

"In every field of endeavor engineers are moving forward daily to work out the remaining technological kinks that must be removed before we are perfectly satisfied with our products," says Mr. Cruse.

"Companies throughout the nation are perfecting improved forms of plastic pipe for air conditioning recirculating lines. Because of the noncorrosion qualities of the plastics, this is bound to be one of the major improvements in the coming 5 or 10 years. Irrigation, oil field lines, and jet wells are using more plastic pipe and pipe laying devices to simplify the equipment and installation of plastic pipe have doubled their efficiency in the past two years."

At this time the U.S. has achieved sizable production in six plastics, Mr. Cruse points out. In addition to PVC there are polyethylene, vinylidene chloride, cellulose acetate butyrate, polyesters, and styrene copolymers. ‡

Compressor Shipments Up 36 Percent

. . . first nine months of 1956

MANUFACTURERS' shipments of compressor bodies used in air conditioning and refrigeration units were up almost 36 percent during the first nine months of 1956—latest figures available—as compared with the same period of 1955, according to George S. Jones, Jr., managing director of the Air-Conditioning and Refrigeration Institute.

The figures, which do not include compressors used in household refrigerators nor a relatively small number designed for use with ammonia refrigerants, were compiled from reports made to ARI by manufacturers whose output is estimated to represent in excess of 90 percent of the industry, he said.

Actual shipments for the nine month period totaled 3,860,273 units, compared with 2,844,741 units for the same period in 1955. Of the 1956 figure, 218,489 compressors were for automotive air conditioning, compared with 255,731 automotive units reported shipped for the entire year 1955.

Figures for compressor bodies 5 hp and above, by categories, are as follows:

Horsepower	Units shipped 1956	
	Sept.	Jan.-Sept.
5	4418	77,180
7½	1813	34,502
10	481	7893
15	278	3059
20	183	2292
25	119	1545
30 and over	461	5504

‡

"Quote"

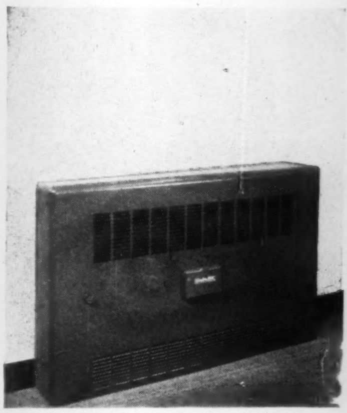
> **"We are at a critical period in our technical and industrial development. We face a continuing labor shortage and educational crisis. The steady percentage decrease in the number of students taking mathematics and sciences is of concern to all industry and this trend must be reversed."—*Dr. R. A. Schatzel, president, American Society for Testing Materials.***

YEAR-ROUND COMFORT BEGINS WITH THIS MAN

He's your Warren Webster Man! And with him, heating-and-cooling comfort always comes first, in homes both modern and modernized. At the right is one important member of his complete family of products — the Webster Heating-Cooling Conditioner.

Here, hot water heating is teamed with chilled water air conditioning in a single central system, without ductwork or window obstruction. Compact, quiet conditioners put comfort at your finger tips . . . individual room controls. Time-tested and performance-proved, it spreads uninterrupted year-long comfort. And every installation is backed by the skill and integrity of Webster's Finest Product — the Warren Webster Man. Call him today for the exciting details.

Warren Webster & Company, Camden 5, New Jersey. Since 1888. Offices in 66 principal U.S. cities and Canada.

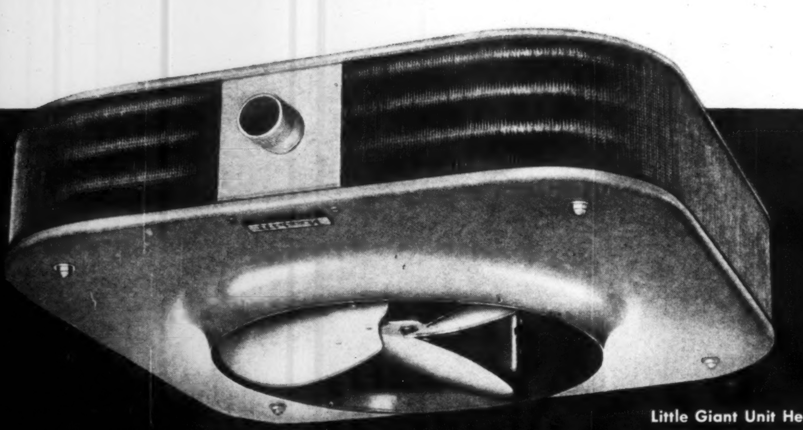


The Webster Heating-Cooling Conditioner

Webster's Finest Product . . . the Warren Webster Man

WARREN WEBSTER

HEATING . . . COOLING



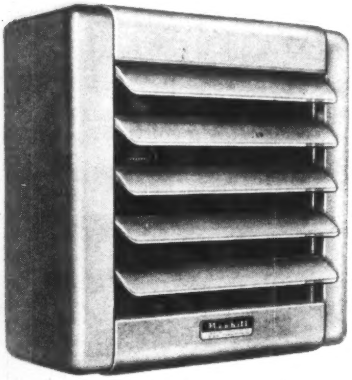
Little Giant Unit Heaters
Universal heating elements, 34 models
34,000 to 684,000 Btu. IUHA Sound rated.
Publication 402

Nesbitt

The Name to Go Buy in Unit Heaters

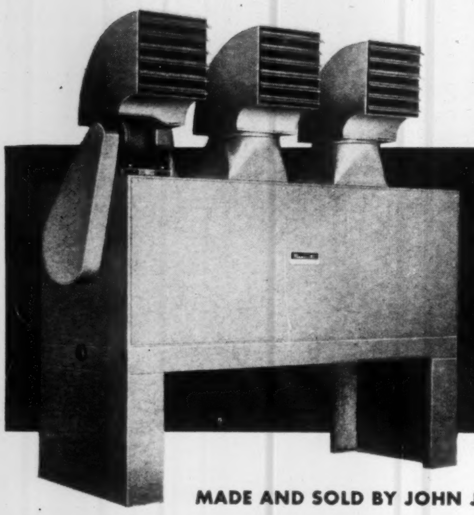
Nesbitt offers the broadest line of industrial unit heaters unmatched for range of sizes and capacities, versatility, and for construction, performance, appearance, and economy.

A product is no better than the reputation of its maker . . . and Nesbitt unit heaters reflect 40 successful years.



Propeller Fan Unit Heaters
Eight basic sizes, 24 models,
15,200 to 335,000 Btu/hr.
Publication 401

Gas-Fired Unit Heaters
Seven models, 400 to 2900 cfm,
25,000 to 200,000 Btu/hr. input.
Publication 280



Giant Unit Heaters
Twelve basic sizes, choice of
10 heating elements, for large
capacity heating and/or ventilating.
Publication 404

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"Open for Discussion"

• WE FOLLOW HERE each month the practice at engineering society meetings of providing an "open for discussion" period. You are urged to take part. Just address your comments to the Editors. Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

Relief Valve at Pump Discharge Important in Installing Rotary Pump

WE HAVE READ the Data Sheet entitled *Fuel Oil Systems with Rotary Pumps*, by M. K. Bond, in the October 1956 HPAC, and would like to comment on it.

The author states that "the rotary pump delivers a given quantity of fluid." We feel that it is more accurate to say that it delivers approximately a given quantity. Slippage on rotary pumps will vary widely, depending upon the pressure differential between the suction and discharge if the fuel viscosity at the pumping temperature is low.

We note that some of the illustrations do not show a relief valve between the pump discharge connection and the first discharge shut-off valve. Although the caption material accompanying the diagrams states that a relief valve should be provided at the pump discharge but is not shown, we believe that this item is so important a factor in the installation of rotary pumps that it should be indicated in every instance. Some pumps have the relief valve incorporated with the pump body, in which case it would not be a part of the pumping system.

We note also that the layout of the piping around the pumps in some instances includes a check valve on the discharge pump connection. While not absolutely necessary, the installation of a check valve in addition to, or as a substitute for, a gate or globe valve is often made. In Fig. 2 if a check valve is provided on the motor driven discharge line, would it not be desirable to provide a similar valve on the turbine driven pump?

G. W. BOHN
Vice President, Engineering
Preferred Utilities Mfg. Corp.
New York

THE AUTHOR'S REPLY — Mr. Bohn mentions that rotary pumps deliver only an approximate quantity of oil. Actually, a rotary pump has a fixed theoretical capacity set by the geometry of the parts. Certain clearances are built into the pump or we might say, clearances that are necessary to make the pump operative. These clearances are fixed and, therefore, the slip of the pump is fixed. Slip is varied only by pressure and viscosity. Therefore, when these two conditions are constant, the pump delivery is a given quantity. In other words, a given quantity is available at the same viscosity and pressure.

Fig. 1, as shown, was meant to be a simple illustration with the bare essentials for good operation. I do agree, however, that relief valves should be installed with all positive displacement pumps.

In Fig. 2, the motor driven pump is used for start-up and standby operation; hence, the reason for the check valve. It is necessary for an operator to start and stop the turbine anyway so he can very easily open and close the valve at the same time. However, the hand valve of the motor pump can be left open for the pump to be ready for instant starting when a check valve is used.

M. K. BOND
Standard Products Division
De Laval Steam Turbine Co.
Trenton, N. J.

Thinks Shell Coefficient Impractical; Prefers to Work Out Total Heat Loss

CAREFUL READING of the article, *Thermal Ratings of Buildings Can Be Uniformly Compared*, by Willie Hammer in the September HPAC, leaves serious questions in my mind as to what practical use might be made of the method of building rating described.

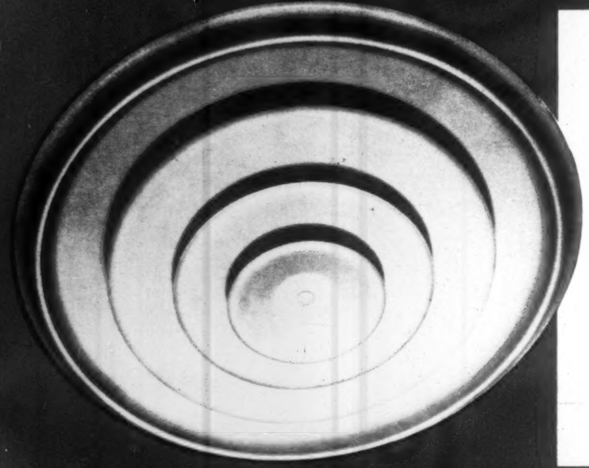
To establish such a "Shell Coefficient", it is still advantageous to work out a complete heat loss of the building, as the resulting figures are most necessary in the heating—or cooling—system design. A summary of these heat loss figures would then give the desired "Shell Coefficient" and "Shell Area," but I believe any one of the examples given in the article could be as easily answered by proper use of the total heat loss figures, together with deg days and temperature differences, without using shell coefficients and areas.

The one use to which such coefficients might be put to advantage would be, as pointed out by the author, a quick comparison of buildings from a construction standpoint. Even here, however, this comparison would be one of heat loss only, and would not distinguish between good and shoddy construction. A well constructed building with a high ratio of glass to wall area might conceivably have a considerably higher shell coefficient than a poorly constructed building with a low ratio of glass to wall area. Hence, consideration of the shell factors by themselves would not be enough to judge good vs poor construction.

The best use of such a measuring stick, I believe, would be that illustrated by the author in Example 4. An owner of several buildings, or a realtor operating

(*Continued on page* 144)

FIRST... CARNES BROUGHT YOU *the finest in* CEILING DIFFUSERS!



MODEL E J

A beautifully styled diffuser that features easy installation; fast, single balancing and adjusting; and a price that meets that of ordinary diffusers Deep ceiling plate prevents ceiling aging and eliminates the need for anti-smudge rings. Model E J (fully adjustable) and Model E (fixed cone) are both ideally suited for use in either exposed ductwork or for flush mounting on ceiling. Available in a complete range of sizes . . . all having the same number of cones to give a uniform appearance when various sizes are used in the same area.

THEN... CARNES BROUGHT YOU *the leaders in* POWER ROOF VENTILATORS

MODEL C L Streamlined, low silhouette model with centrifugal fan. Precision-built for smooth, quiet, efficient operation. Outstanding features are: Maximum capacity through use of latest centrifugal wheel design; all housings of heavy gauge aluminum to eliminate maintenance and corrosion problems; heavy duty, ball-bearing protected motors; backwardly inclined, non-overloading centrifugal fan wheels; available in a large range of sizes to meet all ventilating requirements.

MODEL J Also designed for today's low parapet buildings, with all-aluminum spun housings for elimination of corrosion and maintenance problems. Model J features include: Centrifugal fan wheels statically and dynamically balanced; heavy duty precision pillow block and drive; quiet operation through use of specially designed vibration isolators.

Of course, all Carnes Power Roof Ventilators carry the P.F.M.A. label, your guarantee that actual ratings conform with published ratings.

Certified Ratings

PFMA

SEE US AT THE ASHAE SHOW BOOTH 407
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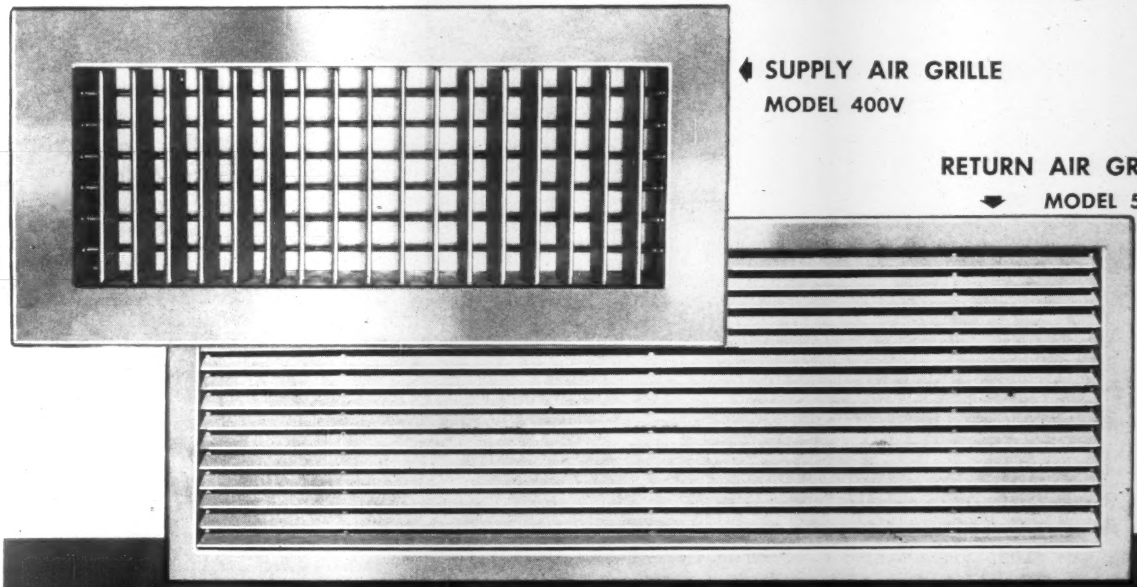
NOW... FROM CARNES

a great new line of REGISTERS AND GRILLES!



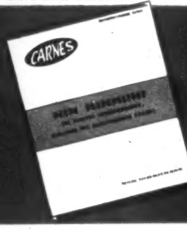
SUPPLY AIR GRILLE
MODEL 400V

RETURN AIR GRILLE
MODEL 550H

Yes, now . . . and new . . . from Carnes . . . a complete line of registers and grilles . . . all backed by the same expert designing, engineering, and manufacturing methods that assure finest quality. There's a model and a size for every specification — all are available in either steel, aluminum or stainless steel. All are equipped with streamlined hollow blades. All Carnes registers can be furnished with either an opposed blade damper or a multi-blade damper, both face-operated. For a fine, varied line that offers quality and economy — specify Carnes grilles and registers!

A COMPLETE LINE TO CHOOSE FROM

REGISTERS		GRILLES	
SUPPLY AIR	RETURN AIR	SUPPLY AIR	RETURN AIR
MODEL 100V—Single deflection, adjustable vertical face bars and blades.	MODEL 500V — Adjustable horizontal blades and vertical face bars.	MODEL 300V—Single deflection, vertical adjustable face bars.	MODEL 550V—Vertical bars set straight or at 45° angle.
MODEL 100H—Single deflection, adjustable horizontal face bars, vertical blades.	MODEL 500H—Adjustable horizontal blades and horizontal face bars.	MODEL 300H—Single deflection, horizontal, adjustable face bars.	MODEL 550H—Horizontal bars straight or set at 45° angle.
MODEL 200V—Double deflection, adjustable vertical face bars, vertical blades, horizontal rear bars.		MODEL 400V—Double deflection, vertical adjustable face bars and horizontal rear bars.	
MODEL 200H—Double deflection, adjustable, horizontal face bars and vertical rear bars and blades.		MODEL 400H—Double deflection, horizontal, adjustable face bars and vertical rear bars.	



Send for **CATALOG** with full information on Carnes new registers and grilles.

CARNES CORP.
VERONA, WISCONSIN

(*Continued from page* 141)

them, might use to advantage such an overall coefficient in making cost comparisons from an operating standpoint. It is also quite possible that other good uses for such coefficients may develop. From a design standpoint, however, it does not seem to be practical by itself, as there are too many contributing factors which require individual consideration as the design progresses.

PAUL H. YEOMANS
Consulting Engineer
Philadelphia, Pa.

THE AUTHOR'S REPLY—I feel that Mr. Yeomans' comments are correct. However, he is regarding the use to which thermal ratings may be put from the viewpoint of a consulting engineer and designer rather than from the viewpoint of the persons for whom it is intended, namely, his clients who are not heating engineers.

He himself indicates that the use to which such a coefficient might be put to advantage is for quick comparisons of buildings. That is the idea of the standard: with a bit of guidance, any nontechnical person would be able to understand the significance of the coefficient and to make the comparisons.

A building with a high ratio of glass to wall area may be of good construction but not of good thermal construction. The term "shoddy" was inserted with the thought in mind of builders who may build hurriedly and skimpily and whose construction may be poor materially, thermally, and in workmanship. The intent of the standard is to compare buildings and their construction thermally and, this will be done by the Shell Coefficient. Consider the advantage a prospective building owner would have in determining from an operational standpoint which of a number of structures to purchase if he had such a standard of comparison upon which to rely.

There are other uses for this coefficient, and if Mr. Yeomans would re-examine the matter from the viewpoint of his clients rather than from that of a designer, I believe he too will find them.

WILLIE HAMMER
Chief, Heating Unit
Repairs & Utilities Div.
Office of the Engineer
HQ, Army Forces, Far East

"Shell Coefficient" Useful to Compare, But Not to Forecast Heating Costs

I READ with more than ordinary interest the article *Thermal Ratings of Buildings Can Be Uniformly Compared*, by Willie Hammer, in the September 1956 HPAC, which proposes as a standard rating a "Shell Coefficient."

A number of years ago I spent a lot of time trying to find some quick and reasonably accurate way to determine what the cost of heating a building should be. My object was to find a yard stick to measure heating efficiency and to compare buildings. I played around with a number of ideas but concluded that the only safe way was the hard way — calculate the heat loss and then make allowances for the type of occupancy, type of heating system, tightness of windows, exposure, and other factors.

Mr. Hammer's idea serves an excellent purpose if it is confined to comparing the value of various types and areas of walls, windows, insulation, and other components for a building in the design stage. At first I thought he had the answer to my problem. But if one applies his coefficient to the comparison of heating costs in existing buildings as he does in Example 4, or to forecast heating costs as he does in the text of Example 2, and again when it is stated that this will "permit building owners and managers to forecast approximate heating and cooling costs," then my experience indicates that whoever does this is heading for trouble. Let me point out why I think that way.

1) Mr. Hammer bases all his calculations on a 24 hr building temperature of 65 F. This may be all right in an office building but not in an apartment house, so right away we must establish the type of occupancy.

2) To maintain a uniform room temperature assumes that this is at a theoretically perfect level, which is a practical impossibility. Many buildings have no control and depend on the skill and attention of the operator which is subject to wide variation. If there is a control system, much depends on how efficient it is and on the degree of attention or abuse by the operator. Even the best automatic control isn't perfect, and there is likely to be some waste through overheating.

3) The shape and height of the building and its exposure to winds will make buildings with identical "Shell Coefficients" vary widely in heating cost.

4) Finally, the type of fuel and heating plant affect the heating cost substantially.

For specific purposes, as in the author's Example 5 dealing with supermarkets, I go right along with him, and I do not mean to detract from the value of his "Shell Coefficient," provided the limitations are recognized.

Most real estate people use the fuel cost per cube for comparative purposes, but I have always said that this is a very deceptive basis. Others use the cost per square foot of radiation, and that comes much nearer the truth because radiation, like the "Shell Coefficient," is the result of all *U* factors combined. The only trouble is that engineers vary so widely in their estimates of infiltration, for example, and sometimes when they have finished their calculations, they add quite a factor just to be on the safe side. It is my observation that the heating systems in most buildings are oversized which makes them harder to control.

LEWIS SMITH
Heating Engineer
New York

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Question of the Month

How Can I Collect from Client?

The Question *How Can I Collect from a Client Who Withholds Final Payment, Claiming His Building's New Air Conditioning System Isn't Performing As It Should?* was asked previously in HPAC, and is repeated here along with some of the answers that have been received from readers. Some answers were published in the January HPAC. Others are invited.

"Our firm designed a fine air conditioning system that went into operation last summer. It serves a comparatively small office building occupied entirely by one tenant. The owner is holding back final payment because he maintains the system isn't performing as it should.

"That's where the 'puzzlement' comes, and here's why. The job was designed to hold 78 F dry bulb and 45 percent relative humidity at the outside design conditions of 95 F dry bulb and 75 F wet bulb. We checked the job carefully on a day when the outside temperatures were at the design condition. We were carrying 74 F DB and 50 percent RH inside — well below what the system was designed to do and which the owner understood he would get when the contract was signed.

"However, he said he didn't think the job was working right — and here's why!

" 'That thermostat on my wall shows a setting for 58 degrees,' he told me, 'but when I move it to 58, your system won't drop the temperature below 74.'

"I told him he wouldn't be comfortable if the temperature in his office were anywhere near 58 F, but got nowhere. I explained how thermostats were marked, and why, and that the thermostat itself doesn't create the temperature it controls.

"What do I do next, other than to go to court?"

Queer Argument Takes the Cake; Contract Specs Make It Absurd

We have all met queer arguments but this one takes the cake. I can hardly believe this client would let the matter come to court without a leg to stand on, and I surmise no lawyer would allow him to do so. Why not try to explain why the dials are marked with such a wide range along the following lines?

For winter heating 72 F is the accepted temperature for comfort, but many people like to set the thermostat down to 60 F or less overnight or on weekends to save fuel. There are places where, like in shops and store rooms, 60 F or even lower is wanted. That is why the dial has a range of temperatures.

For summer cooling it has been found that more than a 17 F differential — 95 to 78 F — between indoors and outdoors is too great a shock for most people, and many don't like as much as 17 F, so they want to be able to set the thermostat up to 80 F or above. So the dial is made to accommodate everyone in winter and summer. Would the client want two dials with different markings to be changed with the change of season?

Another thing, on a zero day the client couldn't get 80 F even if he set the dial there because the system is designed for only 70 F. I don't think he would kick about that, so why does he kick about the reverse situation?

It might be explained that if he had insisted on having a system capable of heating to 80 F on a zero day or cooling to 58 F on a 95 F day, he could have had it. If he had been given this option in advance of signing the contract, he would have considered the extra cost absurd. Don't the contract specifications define the performance? If so, I don't understand why there should be a complaint.

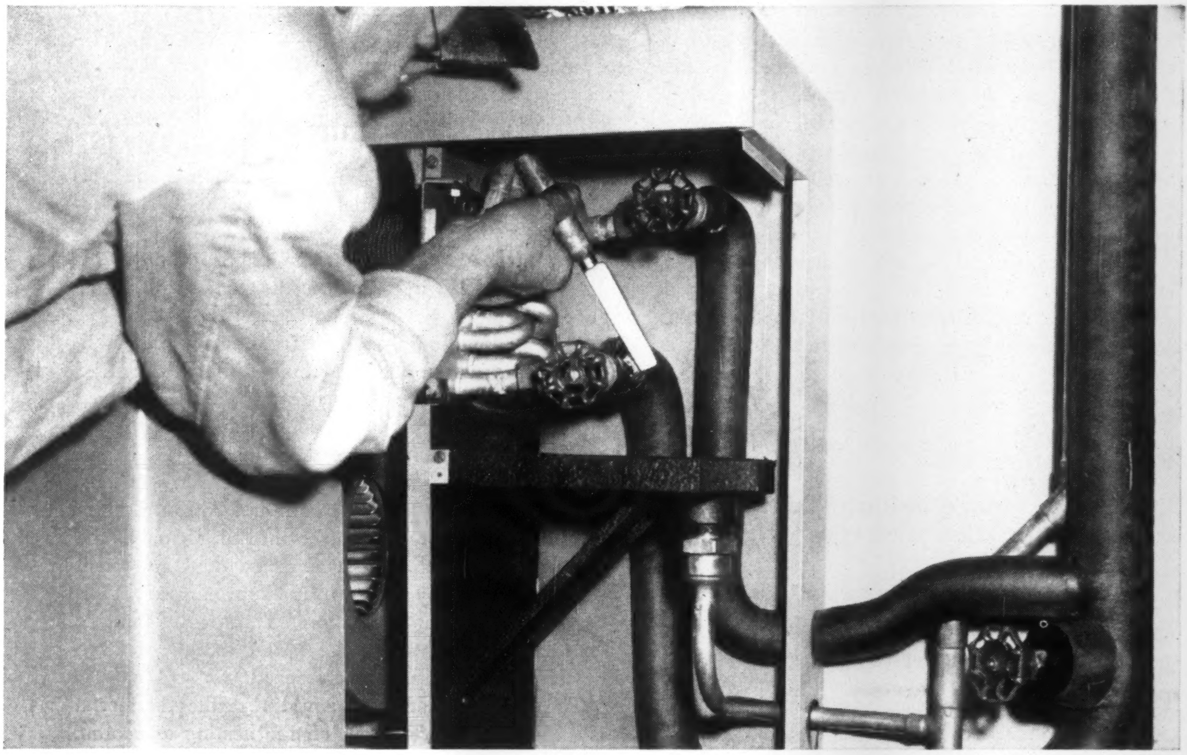
Lewis Smith
Heating Engineer
New York

"Toys" Relieve Tension, Help Explain Scientific Facts and Conditions

A very inexpensive means for settling this case or other similar cases, if the consultants have confidence in their equipment and in its design, would be for the consultants to invest in a suitable wet bulb-dry bulb instrument — a hygrometer. This should be presented to the client, installed for him by, or in the presence of, one of the consultants on this case, and during this time the consultant should issue the usual jargon about how it works and what the instrument indicates.

After some period of time, gaged by the time it takes for nearly all of the water to be evaporated from the instrument but before all the water does

(*Continued on page* 148)



Stop condensation with highly efficient Armstrong Armaflex. This new insulation for liquid cooling and heating lines has a conductivity of 0.28 Btu./sq. ft./in. thickness/hr./degree F. temp. difference at 75° mean temperature.

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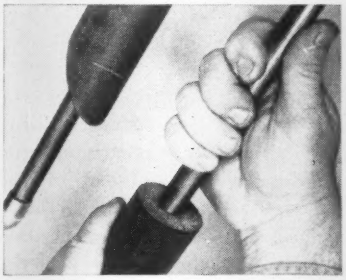

Fast, easy to apply. Armaflex can be slipped right over tubes or pipes as they're being installed. A talc coating inside speeds application.

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Rapid insulation of fittings is accomplished by miter-cutting pieces of Armaflex, snapping them into place, and sealing with Armstrong 520 Adhesive. No other sundry is required.

(*Continued from page 146*)

actually evaporate, the consultant should check back with his client who should now be convinced that his arguments against the so-called improper operation of the equipment are totally invalid. Of course, more than one such visit may be required to effect this attitude in the client, but these visits might well be rewarded by payment of the final portion of the debt owed.

"Toys" sometimes relieve lots of tension, and are also useful in explaining many scientific facts and conditions in a very simple manner. I hope that the above suggestion may prove helpful to the consultant with the "sales problem."

THOMAS MCLAUGHLIN
Engineer
The Hartford Electric Light Co.
Hartford, Conn.

Client Needs More Selling; Completely Review Transaction with Him

THIS PROBLEM is intriguing since it portrays a fairly common condition facing consulting engineers. I refer to the complete lack of understanding by the average layman of the simplest basic principles regarding air conditioning and/or heating.

Quite frequently it becomes necessary to educate the client or his representative regarding the basic principles involved and the standard or special design procedures used by engineers in the solution of cooling and heating problems.

Assuming that the system is properly designed and installed and is operating under design conditions, the client should be guided through a complete verbal review of the transaction, the preliminary discussions, and the contract agreement to bring out the fact that what he actually wanted and agreed to pay for was comfort, and in the absence of specific instructions as to design temperature, and other technical data, the engineer based his design on standards used by the industry. Had the owner specified some particular design conditions other than standard, they of course, could have been used in the design.

In addition, the client should be advised that, in the interests of economy, available standard equipment is normally used wherever possible, thus the thermostat with the low temperature setting is used in this case. Also, if this is a combination thermostat for cooling and heating, the low setting might be used for night setback on the heating cycle.

An explanation of the theory of air conditioning design should be given, reduced to its simplest form. For example:

An air conditioning system for human comfort is usually designed to do two things: (1) Reduce the temperature to a comfortable level; and (2) Reduce the relative humidity to a comfortable level. In this case the design temperature reduction was 17 F, and the design relative humidity was 45 percent with outside conditions of 95 F dry bulb and 75 F wet bulb. Considering the temperature differential only, the client should be made to understand that the system can lower the temperature inside approximately 17 F below the outside temperature. Thus if the outside temperature were 75 F, the lowest setting of 58 F on the thermostat might be reached.

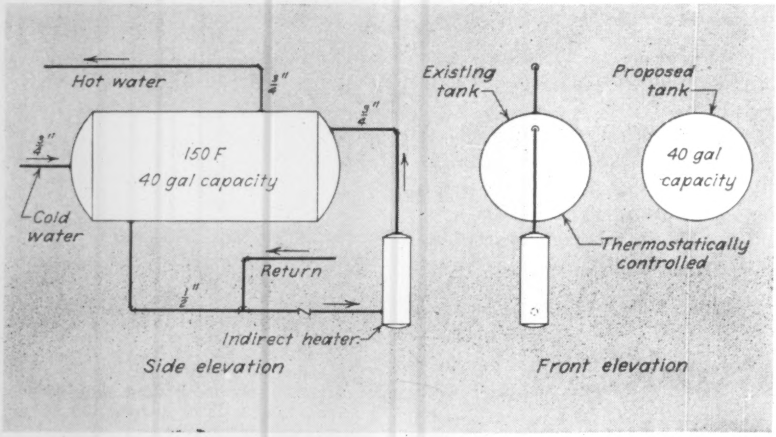
The client should be advised that the thermostat is a limiting device to cut off the heating or cooling system when its full capacity is not needed. However, it merely lets the system continue running when its capacity is exceeded.

Summing up the problem, it is essentially a problem in salesmanship. Some clients require more selling than others. This one appears to have been undersold. My advice is to go back to him and sell him with facts, stated clearly and simply. Prove to him that he is getting what was agreed to in the contract, that it is what was desired, and that the engineer has fulfilled his responsibility to his boss, the client.

FRED KULL
Consulting Engineer
Monroe, La.

READER ASKS—

"How Should Piping Be Connected Between Two Hot Water Storage Tanks?"



"How should I connect an existing indirect fired hot water storage tank to another tank to double the capacity, using the same heater. How can I be sure that both tanks will be filled with hot water before the thermostat shuts down the heater? The maximum water flow rate will be 3 gpm, and the usage will be intermittent. —T.E.S.

• *YOU ARE INVITED to answer this question. Write: The Editors, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.*

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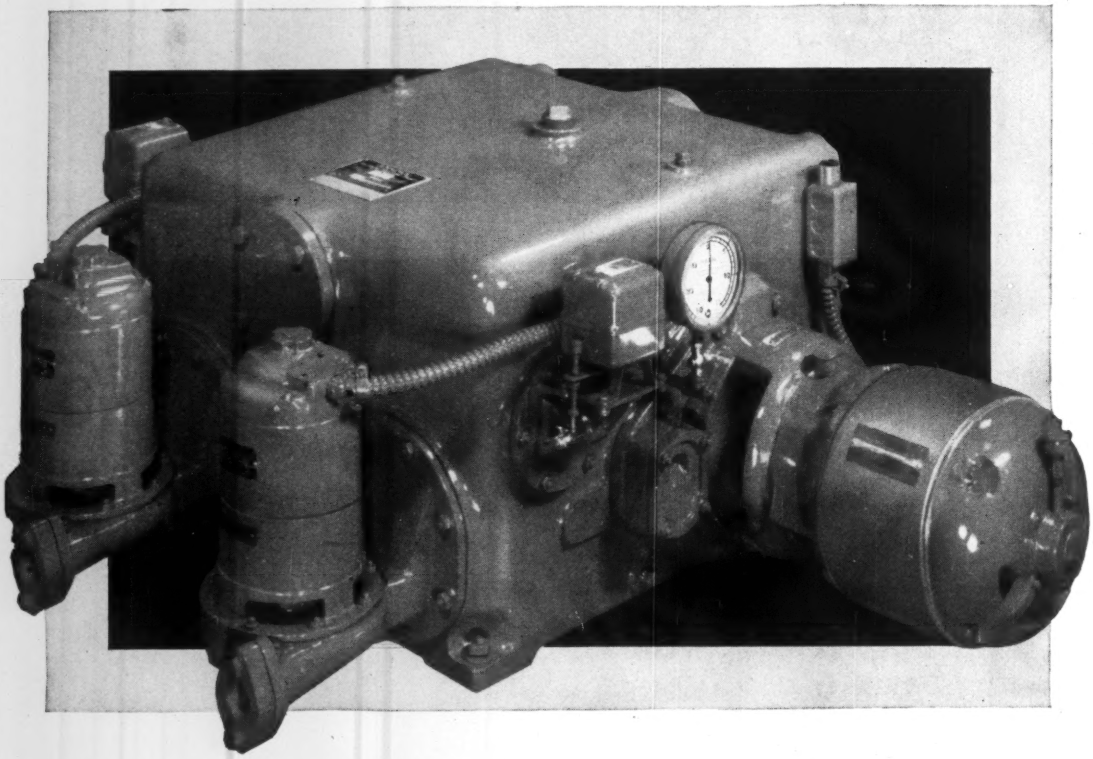

It's the Nash CSM

Designed and manufactured by the organization that made the Jennings Manifold Heating Pump standard of the Heating Industry, the new CSM incorporates every desirable feature architects, engineers, owners and operators have sought. Employing separate air and water pump elements, each with its own motor and each independently controlled by its own automatic switch, the capacities and arrangement may be widely varied to meet job conditions. For the first time, the engineer has the choice of realistic water and air capacities required for rapid system response without wasteful overheating.

These pumps possess many other features which permit a more efficient utilization of fuel and minimum use of electric power. Low, low returns reduce installation costs and usually eliminate putting the pump in a pit. Simplicity and efficient operation reduce supervision and maintenance costs. Information regarding this new heating pump development is available immediately upon request.

- ✓ **Increased air capacity induces rapid system response without wasteful overheating.**
- ✓ **Separate air and water pumps individually selected to meet actual job requirements.**
- ✓ **Control system that operates individual pumps only when needed.**
- ✓ **Flexibility permitting addition of radiation without changing basic pump installation.**
- ✓ **Low, low, return line connection.**

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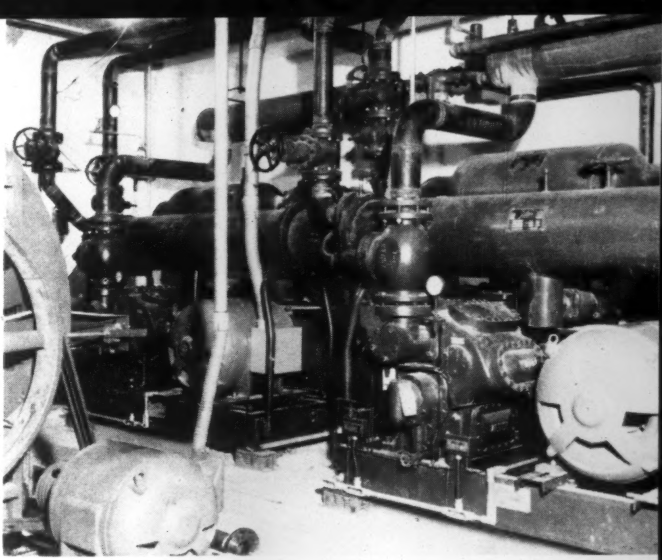
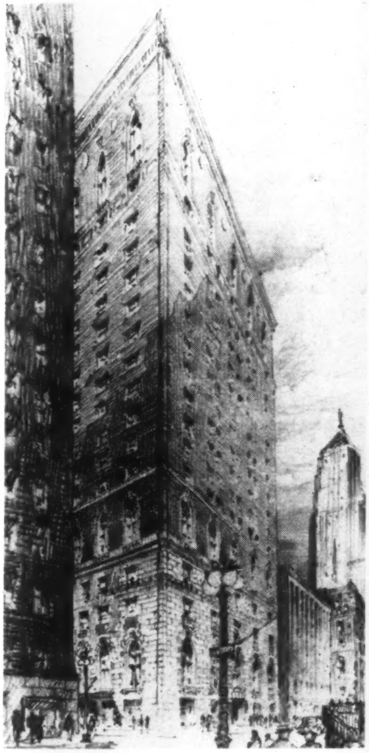
420 ton direct expansion system — with five compressors and five condensing units at the basement, seventh, and 18th floor levels —



Air Conditions Union League Club

. . . one of Chicago's first large residential buildings to be completely air conditioned



UNION LEAGUE CLUB was air conditioned for less than $2.50 per sq ft for the 140,000 sq ft area on 20 of its 24 floors

BY DEANE E. PERHAM
Mechanical Engineer
Vilter Manufacturing Co.

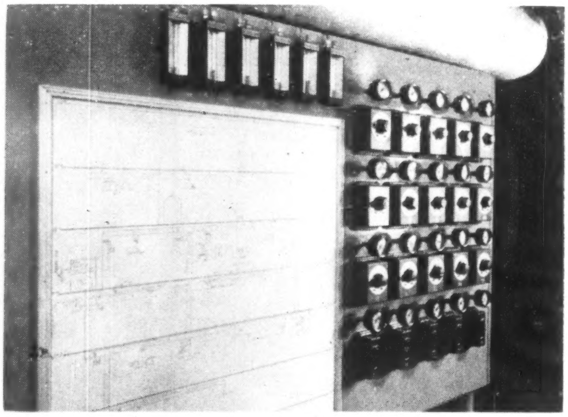
The Union League Club of Chicago at 65 West Jackson Blvd occupies a 24 story building erected more than 25 years ago in the Loop area supplied with direct current electric service. The first air conditioning problem was the conversion from direct to alternating current electric service for the entire building at considerable cost and requiring a year or two.

Conditioned space includes 20 floors totaling approximately 140,000 sq ft of floor area. The initial cost of the system was less than $2.50 per sq ft.

The first nine floors contain about 40 rooms of diversified use with varied cooling requirements: lobby, men's lounge, ladies' parlors, ladies' cocktail lounge, library, men's grill and bar, club business offices, and 14 dining rooms seating from 10 to 600 persons.

. . . refrigerant is piped to 12 rows of cooling coils

ALL OUTDOOR AIR for the 18th floor air handling and cooling coil unit passes through two banks of oil filters and a mat type filter before passing through the direct expansion cooling coils



PNEUMATIC CONTROL PANEL interlocks the distribution of all air from the two compressors and condensing units on the seventh floor and the compressor and condensing unit in the basement, all serving the lobby to 9th floor inclusive

The upper floors of the building contain 230 sleeping rooms, all of which are air conditioned for summer cooling and for winter ventilation with humidified air.

In the design of the cooling system it was necessary to provide flexibility, owing to the wide range of room capacity requirements. Dining rooms for instance have peak demands for about 2 hours at noon, and sometimes the peak occurs again in the evening. The balance of a day and evening usually requires only 25 to 50 percent of the peak cooling capacity.

Sleeping rooms can vary from 50 to 100 percent in cooling requirements, depending upon occupancy and use of cooling by the occupants.

The air conditioning system is of the direct expansion type and uses a No. 12 fluorinated hydrocarbon refrigerant. The air unit cooling coils are deep in direction of air travel, permitting operation at high refrigerant evaporator temperatures and the resulting low brake horsepower. The system is designed to use 100 percent outdoor air.

Cooling Capacity Is 420 Tons

The compressor cooling capacity is 420 tons, requiring 335 bhp. There are five compressor units each with capacity modulation, and four air units, at the basement, seventh, and 18th floor levels. A water cooling tower is on the roof, and condenser water circulating pumps are on the 20th floor.

Air units are close to compressors, requiring short refrigerant lines.

One 90 ton refrigeration compressor and condensing unit is in the basement which serves the requirements of the entire first floor, the second floor lounges, and the library on the fourth floor. The compressor is driven by a 75 hp motor.

There are two 65 ton compressors and condensing units on the seventh floor which are driven by 60 hp motors. These compressors serve the requirements of all the dining rooms, the bar, card rooms, executive offices on the ninth floor and other spaces from the third to the ninth floor.

There are two 100 ton compressors and condensing units on the 18th floor which are each driven by 100 hp motors. The space served by these units includes the 10th to the 19th floors inclusive.

Save On Horsepower

The refrigerant is piped to 12 rows of cooling coils through which the air to be conditioned is passed. The average length of refrigerant piping is about 10 ft. and the maximum length is 20 ft.

All of the compressors and condensing units operate on a suction temperature of 50 F and a condensing temperature of 105 F.

Under these conditions, a ratio of 0.77 hp per ton of capacity results. If the suction temperature remained at 50 F and the condensing temperature should be reduced to 90 F, the ratio would drop to about 0.61 hp

through which the air to be conditioned is passed

per ton of refrigeration capacity. However, if the suction temperature should be reduced to 35 F and the condensing temperature were 90 F, the ratio would be 0.81 hp per ton of refrigeration capacity. Then if the condensing temperature had to be 105 F and the suction temperature remained at 35 F, the ratio would be about 1.00 hp per ton.

In this installation, the 12 rows of coil surface through which the air passes provides an air temperature leaving the coil surface at 60 F.

The capacity of the cooling tower, which is 330 ft above the basement condensing unit, is 1350 gpm. Water is circulated from the condensing units in the following flow rates:

a) Basement (90 tons of capacity) 275 gpm.

b) Seventh floor (2-65 tons of capacity) 180 gpm each.

c) 18th floor (2-100 tons of capacity) 300 gpm each.

The condensing water piping varies from 4 in. in diameter from the basement unit to 5 in. in diameter after the condensing water for the seventh floor units is added, up to 8 in. in diameter after the water from the 18th floor units is added.

On the 18th floor air is passed through an oil filter twice and then through a mat type filter before entering the 12 row cooling coils. Heating coils are also provided for tempering the outdoor air for ventilation.

Pneumatically Set Air Dampers

Pneumatically controlled air volume dampers regulate the air flow rates to the various areas. By means of constant pressure differential controllers in the fan discharge ducts and a vortex control at the fan inlet, the air quantity admitted into the fan is always very close to the required amount.

When the air flow rate is increased, the compressors and the condensing units modulate their output automatically. The compressor in the basement and the two compressors on the 18th floor may modulate their output between full load and 50 percent of full load. The two compressors on the seventh floor may modulate their output between full load and one-third of full load.

No Ducts In Dining Room

The main dining room is about 75 × 100 × 30 ft high. Because of its unusual ceiling decoration, no ducts could even be furred in. Therefore, all conditioned air is admitted through two diffusers high over the main entrance into the dining room. The temperature difference from one end of the room to the other is only 1 F on a design day when the dining room is close to full occupancy. As the load increases, the air velocity through the two diffusers increases. However, when the load increases, it is mainly because of the larger number of occupants which also increases the basic noise level. So objections to noise in this system have not existed.

Owing to wide range of cooling loads at different hours of the day and peak loads of certain areas having a short duration, some only two hours, the starting and stopping of compressors and fans is manual although the equipment is arranged for adding full automatic control.

Air System Is Interlocked

Serving the lobby to ninth floor inclusive, air ducts lead from three air units, one in the basement and two on the seventh floor, to over 40 conditioned spaces. The system is interlocked so that by means of dampers manually and thermostatically controlled, air from any one of the three fan units can reach most of the conditioned spaces of the nine floors making a very flexible system.

The only space taken away from the regular club use was one squash court on the 18th floor and the top half was floored over providing a new club meeting room.

Wherever possible existing air duct space and some existing ducts were used. Some existing outdoor air intakes were used and at the 18th floor new intakes were provided and double banks of filters were installed to handle 60,000 cfm of air.

The conditioned space involved is a solid area on each floor, and each space adjacent to another is with no room between for air ducts nor any room below or above. The building as erected included supply and exhaust ducts to all space and outside air shafts so the problem was to utilize as much of the existing ductwork and the shaft as possible and supplement it with new ducts only where necessary.

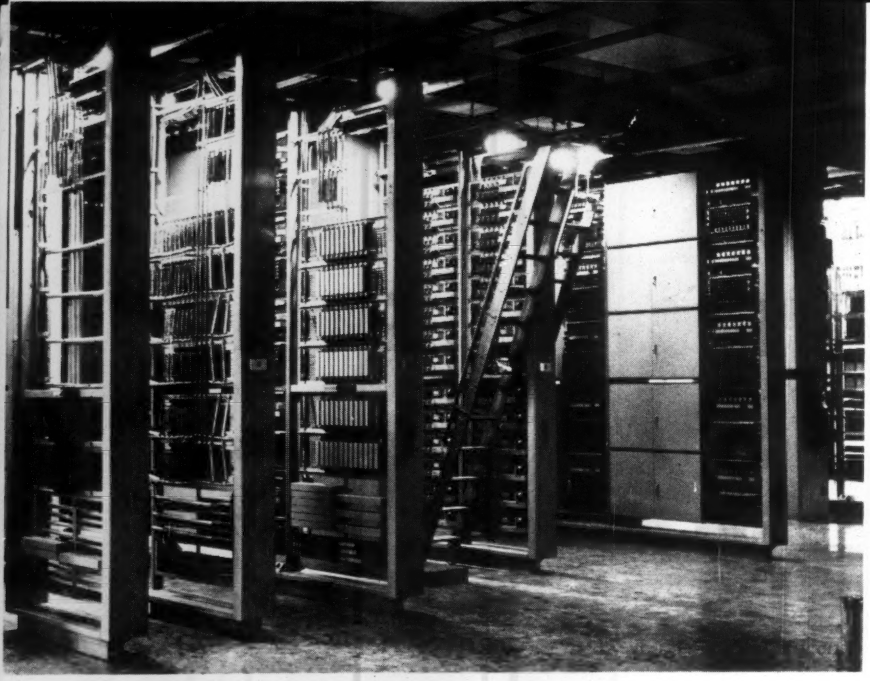
The quantity of air cooled and circulated per hour weighs approximately 210 tons. The water removed from the air under standard conditions approximates 150 gal per hr.

Manually Control Some Rooms

Control for the lower nine floors is by means of 20 pneumatic dampers manually operated for some spaces and thermostatically for others.

Sleeping rooms are controlled manually by the room occupant but can be made thermostatic when desired.

General maintenance of all equipment is under the club's chief engineer and his staff. ‡



SWITCHING EQUIPMENT is one of the hottest trouble spots of all, requiring cooling, humidity control, and highly efficient filtration of air. Four changes of air per hr are provided

BY C. C. BECHER
Building Mechanical Engineer
Illinois Bell Telephone Co.

Plan $11 Million To Air Condition Illinois Bell Telephone

. . . to include telephone equipment and general office space in Chicago. Since World War II, new buildings and additions have been air conditioned. As a result, dial circuit troubles have been cut 30 percent, employee morale and efficiency have been raised, and building maintenance savings up to 50 percent have been experienced, as well as other advantages.

AIR CONDITIONING gets part of the credit for the improved telephone service of today. Almost 6 million calls are made daily in Chicago. Each one requires a series of about 7500 electrical contacts. This represents a lot of potential circuit trouble.

Yet in today's air conditioned dial telephone buildings 67,000 calls go through for each case of trouble found in central office apparatus. This is a 30 percent improvement over the days before air conditioning.

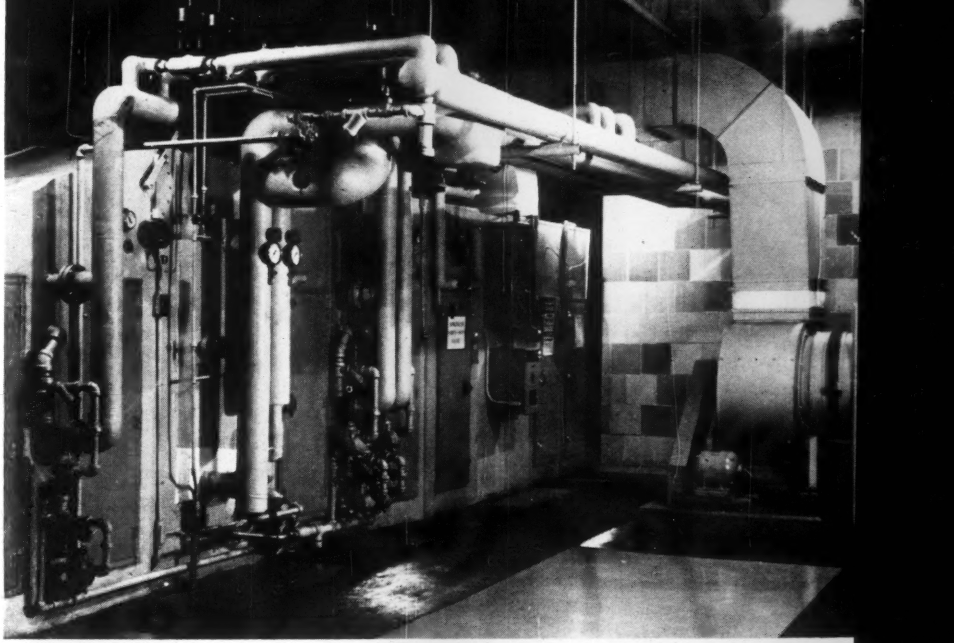
The foundation for today's standard for air conditioning telephone equipment buildings was laid about 17 years ago. The air today is little different from what it was then. It contains dust, pollen, lint, fly ash, smoke, soot, tar, and other products of combustion. Dust and lint cause electrical contact failures. The products of combustion components cause corrosion and wear on moving parts. Soot and smaller particles of combustion compact with dust and lint to form a sticky black substance. This causes open contacts in telephone switching equipment and is very difficult to remove.

Used Two Stage Filtering

The first effort to reduce switching equipment failures caused by atmospheric contamination employed two stages of filtering. The first stage was a 4 in. bank of replaceable spun glass filters. The second stage was a 16 oz wool felt filter. This was placed in tandem with the spun glass filters. This system of filtering removed the "large" particles of dirt, those which normally can be seen by the naked eye. While these filters made some improvement in service, they did not adequately remove fine soot particles.

Humidify Air in Winter

It was also determined that moisture content and volume of air



CENTRAL SYSTEM air conditioning is basic type today. In two new accounting buildings radiant ceiling panels, with a small central air conditioning system for ventilation, cool or heat space

movement are factors affecting telephone switching equipment performance.

The moisture content of the air varies from season to season and from hour to hour. Changes in this moisture content or relative humidity cause dimensional variations in the insulating materials used in telephone equipment. High relative humidity accelerates corrosion of metal parts. Excessively high relative humidity under certain conditions will cause actual moisture condensation, resulting in breakdown of apparatus insulation. If the air is too dry, large quantities of dust, lint, and other particles are airborne, contributing to a high rate of electrical contact failures.

The first efforts to improve relative humidity centered around methods of adding moisture to the air in the switchrooms during the winter months. The immersion type evaporator using steam coils in a water tank did not prove too successful. Early efforts using water sprays presented some problems, but today's humidistats control a bank of sprays in each ventilating system to maintain 30 to 40 percent relative humidity in all air conditioned dial telephone switchrooms.

Install Air Conditioning

The next step to further improve service called for air conditioning. To the telephone equipment maintenance engineer this means year 'round control of relative humidity, low volumes of air movement, and good filtering of air. This portion of the program was started after World War II.

Today's modern telephone building is air conditioned by a central system. This system has a central air conditioning housing which includes several pieces of equipment. This housing is either in the basement or on the upper floors. It is generally about 8 ft high, 10 ft wide and 30 ft long. Air is processed as it passes through and is then distributed to telephone equipment rooms and office areas.

As the air enters this housing, outside air and return air are mixed in a ratio to meet city code requirements. First the mixed air passes through spun glass filters where dust particles the size of mist particles or heavy fog—50 microns—are removed. Then it passes through an electrostatic filter where dust particles similar in size to those which create smoke—1 micron—are removed. Finally the air passes through felt filters. A felt filter which is effective in removing only dust or dirt particles seen with the naked eye—20 microns—is located after the electrostatic filter. The reasons are these: Occasionally there is a buildup of soot on the plates of the electrostatic filter which breaks off in large chunks. The felt filter catches these chunks. There also are times when the electrostatic filter is short circuited momentarily. During this time, the felt filter "bridges the gaps" to substitute its filtering action down to 20 microns particle size.

The air next passes through a heating coil thermostatically operated to give air temperature of not less than 50 F on the leaving side. Next the air flows through the cooling coil and humidifier section. In summer the air is cooled and dehumidified. In winter, moisture is added. In this way 45 to 55 percent relative humidity is maintained in summer and 30 to 40 percent relative humidity in winter.

On a typical 75 F spring day when it is raining outside, as much as 835 qt of water is removed from the air delivered to a typical equipment room every 24 hr to maintain the room air satisfactory

> **". . . We are working on an orderly program of air conditioning the balance of our telephone buildings."**

for equipment operation. It is necessary to cool this outside air well below the 75 F room temperature, say 50 F to "wring" out the excess moisture. This air must then be reheated before it enters the telephone equipment room or space occupied by people to prevent discomfort due to cold drafts. A reheat coil thermostatically operated heats the air leaving the cooling coil section to a temperature high enough to maintain comfort in the occupied spaces.

Change Air Every 15 Min

The air finally enters the room at a low velocity to minimize impingement of any dust or soot particles which might get through this central air conditioning housing.

As small a quantity of air as possible is delivered to the air conditioned central office apparatus room. In straight ventilation this is about eight air changes per hr. In air conditioned spaces this is generally less than four changes per hr.

In other words, the cooler the air, the less is required to maintain comfortable temperatures. Also the less air handled, the lower the operating and maintenance costs.

Radiant Panels Heat, Cool

We continually are looking for better ways to do the job. For example, we are presently completing two new office buildings using an entirely new type of air conditioning system.

For these buildings a suspended metal type acoustic ceiling serves as a radiant heating panel during the winter and as a radiant cooling panel during the summer. A small central air conditioning system provides the necessary ventilation. With this radiant ceiling the central system is required to handle only about one-half the normal quantity of air required in a conventional system.

The first use of air conditioning in the Bell system was centered in the equipment rooms, because of the critical problems of dirt and humidity mentioned earlier.

Gradually it became obvious that air conditioning of all other quarters could also bring many benefits, including reduced operating and maintenance costs and increased employee morale and efficiency.

Also Use Unit Air Conditioners

"There is more than one way to do a job," and this saying applies to air conditioned telephone buildings. Each situation is different, and we try to install equipment that is suited to the situation. Window air conditioners are being used in many office quarters scheduled for remodeling or reassignment in the near future where long installation life is not required.

In other locations, where longer life is expected, we are using package air conditioning units, often containing heating coils. This type of installation is usually in the space the unit serves or is directly adjacent to it. Ducts distribute the conditioned air to the space being served. When heating coils are installed, this unit is used year 'round.

Air Conditioning Saves Money

Comparative studies between conditioned and nonconditioned spaces indicate the following maintenance savings on an annual cost basis:

Operation	Air conditioned space maintenance savings, percent
Central office maintenance	13
Building service*	50
Decorating	30

*Housekeeping work operations such as damp sweeping, washing light reflectors, dusting, cleaning venetian blinds, and waxing floors.

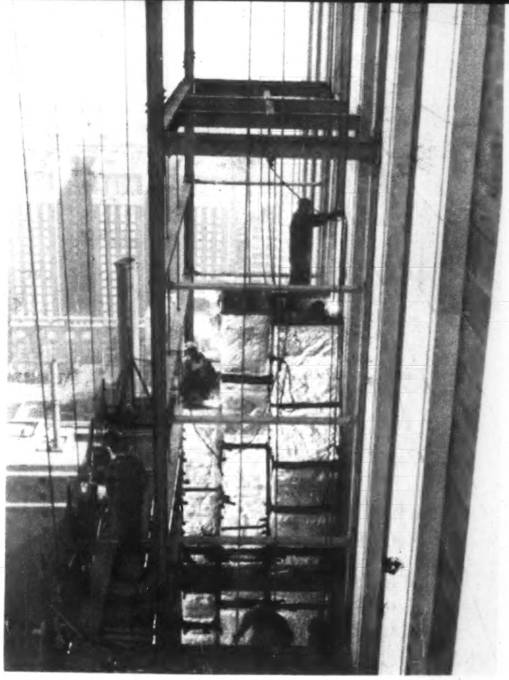
How do first costs compare? Our studies indicate for a typical three to four story telephone exchange building, first costs are the same. When we use outside air for cooling, the ventilating system is designed so that the temperature in telephone switchroom areas normally does not exceed the outside temperature during the summer by more than 8 to 10 F. This means that we must have at least eight air changes per hr. By using refrigeration for cooling, these requirements can be reduced to between two and three air changes per hour. The big difference to the employee is that the use of refrigeration would bring the room temperature down to 10 F below the outside temperature, as compared with a ventilating system which might result in a temperature 10 F above the outside temperature.

A four story telephone exchange building will normally require five ventilating systems using outside air for cooling, while with refrigeration the same job can be done using three duct and fan systems. Costs associated with the two additional systems, using outside air cooling, offset the cost to install refrigeration.

When air is filtered on a comparable basis for both types of installations, it becomes more economical to air condition. Thus, it pays to air condition — both from a cost and an employee morale standpoint.

Will Spend Over $11 Million

Generally, we have air conditioned all new buildings and building additions since World War II. This totals approximately 1.2 million sq ft of telephone building space at a cost of about $4.6 million. We are presently working on an orderly program of air conditioning the balance of our telephone buildings at an estimated cost of $6.5 million. This, when completed, will include all telephone equipment and general office space in the Chicago area. Thus it can readily be seen that air conditioning is a big factor in telephone service today and in the future. ‡



What's Happening In Chicago

. . . *in heating and air conditioning large buildings*

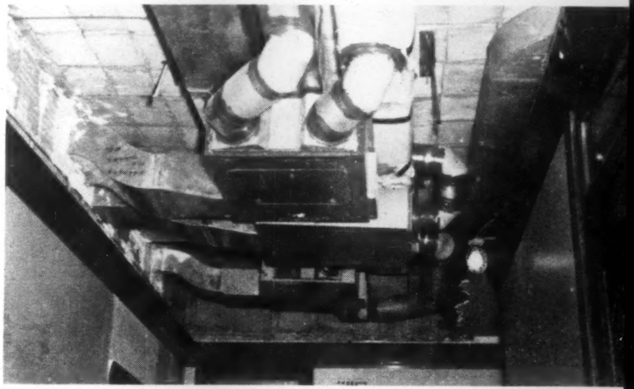
Many interesting and novel ideas are being put to work in the installation of air conditioning systems in new and existing buildings in the Chicago area. In this and the following two pages are presented highlights of three jobs which are of interest. Because the 13th International Heating and Air Conditioning Exposition and the 63rd Annual Meeting of the American Society of Heating and Air-Conditioning Engineers are being held in Chicago this month, we have grouped these installations together for the interest of those planning to attend the meeting and the show and for those that are not able to attend but who would like to know what is happening in Chicago in this growing field. Other Chicago installations are described on pages 151, 154, 160, 162, 165, 173, 180, 188, and 190.

Here's How the Field Building Is Being Air Conditioned

Photo above

TWO DUCT TOWERS are installed on the outside of the Field building for the supply and return air. The towers are about 21 ft wide and protrude about 8 ft from the building. The duct towers accommodate the graduated duct system for all floors above the 25th floor. Each duct is insulated with 2 in. glass fiber insulation on the outside covered with aluminum foil, and the inside insulation is 1 in. thick

THE FIELD building is 43 stories high with a setback at the 25th floor. The first six floors were air conditioned several years ago. Last year the current project to complete the air conditioning of the entire building began. The top 37 stories are divided into two zones. Fans and other equipment are on the 25th floor setback and enclosed. Supply and return ducts for the 26th through the 43rd floors were installed outside the building on the north side. The supply and return ducts for the seventh through the 25th floors are in two abandoned elevator shafts.



A DOUBLE DUCT SYSTEM provides year 'round comfort in the office areas. One duct provides warm air year 'round; a second duct provides the cool air to mixing boxes mounted above the corridor through spiral duct connectors. Another duct system returns the air from the conditioned spaces. These ducts and mixing boxes will be enclosed with a furred ceiling

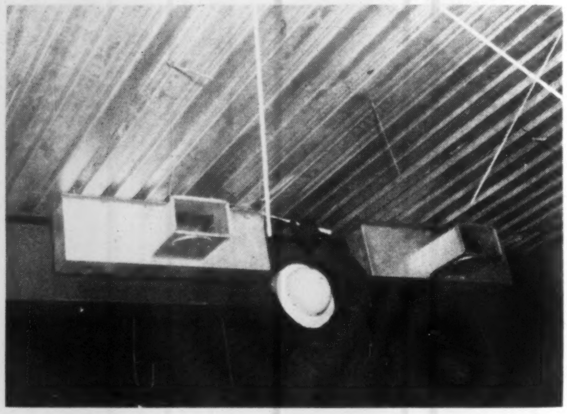
TWO SUPPLY and one return air ducts enter Field building at each floor from the "outside" ducts through the wall, as shown here. All ducts are insulated with 2 in. glass fiber insulation

DUCT SYSTEMS for Field building floors 7-25 are fed from ducts in two abandoned elevator shafts. Two supply ducts and one return duct are in these shafts, thereby resulting in a saving of additional rental space

The Inland Steel Building Is Doing It This Way

WARM AND COOL AIR will travel through subfloor ducts up into channel floor spaces, $3\frac{1}{8} \times 3\frac{3}{4}$ in., out to the perimeter of the building where the air is introduced into the occupied space above at the floor level. Shown here is sheet metal worker cutting openings in the bottoms of floor channels

THE INLAND STEEL building now under construction consists of 19 stories. The air distribution system for the air conditioning system is unique in several respects. The cooling load for the building is estimated to be about 475 tons, and two compressors of 475 tons each will be installed to supply the requirements and provide reserve capacity. Two boilers of 500 hp in capacity will provide the steam for heating. The air will be heated by passing it through steam heated coils. A third boiler of 150 hp capacity will provide steam for summer needs.



SPECIAL TRANSITION BOXES made of 18 gage sheet metal connect the rectangular ducts to the floor channel spaces through which the air travels out to the perimeter of the building. Each box is provided with a fire damper to prevent the circulation of smoke through the building if a fire develops

Here's What Was Done in the New Prudential Building

THE NEW Prudential building, completed in 1955, was the first new skyscraper to be built in Chicago in more than 20 years. It has 41 stories, with over 1 million sq ft of rentable space. The building is completely air conditioned by three 900 ton motor driven centrifugal compressors. Each 900 ton compressor produces 1700 gpm of chilled water at 42 F which is circulated throughout the building. Also installed are some direct expansion systems to serve special purpose areas such as the observation deck — 66 tons; the assembly hall — 120 tons; and the restaurant — 200 tons.

Since the building is so close to the Chicago river, a 30 in. condenser cooling water line is installed to meet the condensing needs. Three pumps deliver a total of 5400 gpm of river water to the refrigerant condensers. Two more pumps supply condenser water to the direct expansion units.

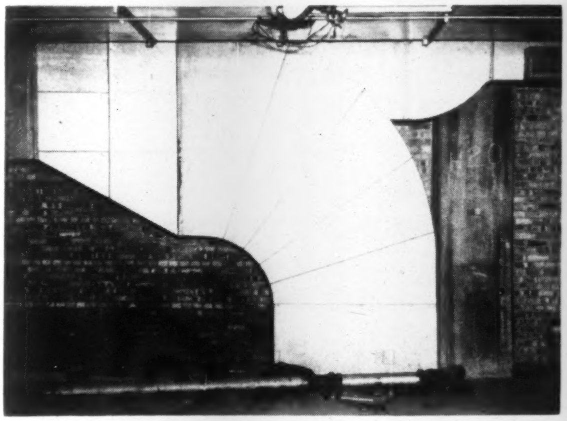
Steam for heating is generated at 135 psig in three boilers burning coal. An additional package boiler is gas fired for process steam.

Two methods are used for heating and air conditioning the occupied spaces:

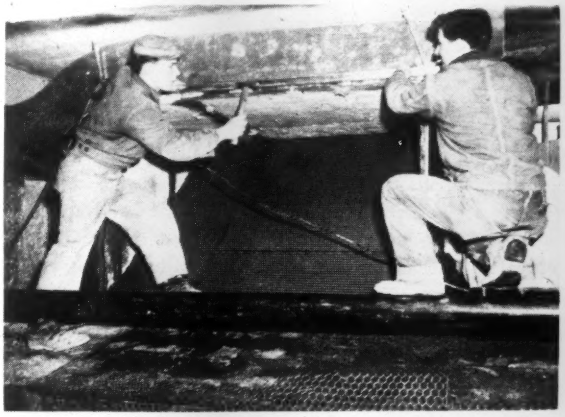
a) In the interior bays, a fan system delivers air over steam coils for heating or chilled water coils for cooling to ceiling diffusers through ducts.

b) Perimeter areas are served by more than 2600 units below the windows which mix cool air introduced into the unit and induced room air over a chilled water coil or a heating coil to satisfy the requirements.

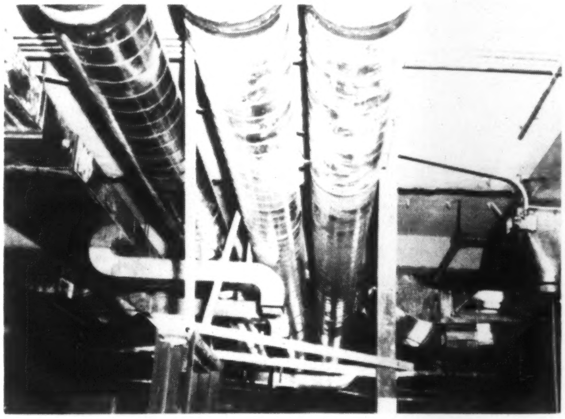
Snow melting coils are installed in the entrance areas. Steam heated oil is used in the embedded pipes. Control is manual. ‡



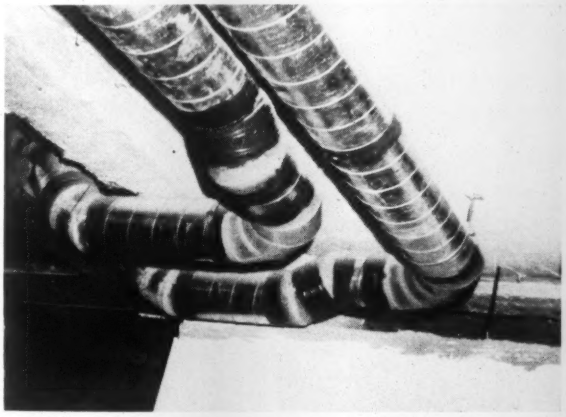
HORIZONTAL DUCT against the ceiling turns to parallel the wall before entering the floor below. The quantity of air handled through both the high and low velocity systems is 836,560 cfm. The estimated length of ductwork is 25.5 miles



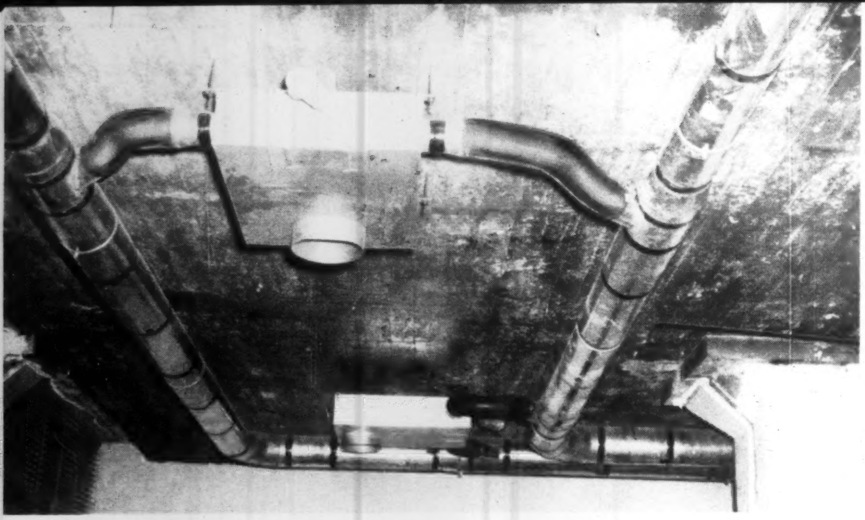
SECTION OF DUCTWORK is fastened to a fan housing here. Also shown are the turning vanes which are installed on each elbow in the large ducts



HIGH VELOCITY air from 10 fans is delivered to the perimeter units through round ductwork. These 10 fans deliver the air under a static pressure of 10 in. water gage and discharge through sound absorbers



HIGH VELOCITY DUCTS wind around structural beams and over low velocity distribution ducts. High velocity duct joints were sealed with pressure sensitive tape and then covered with a synthetic rubber sealing compound



HIGH PRESSURE AIR SYSTEM was selected because of existing ceiling heights and in order to maintain some existing ceilings

BY JAMES H. STIGGLEMAN
Chief Mechanical Engineer
Childs & Smith
Architects & Engineers

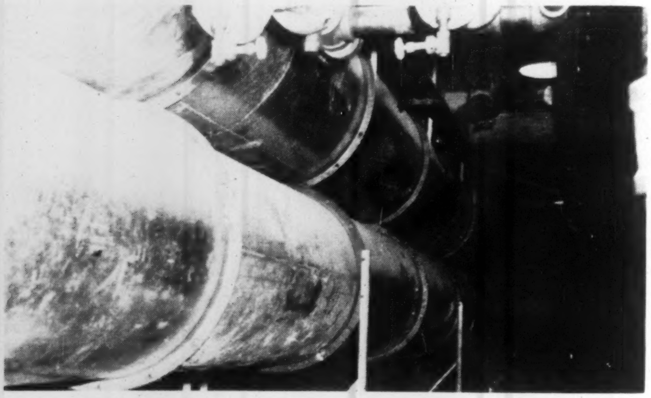
Double Duct High Velocity Air

. . . *conditions new six story addition and*

The American Dental Association, in Chicago, was faced with the problem of having cramped inadequate quarters together with poor light, ventilation and heat and no air conditioning. It was decided to add an additional floor to their quarters, and a six story addition, with full basement, along one side. During the entire construction period it would be necessary for all employees to continue work and to shift storage facilities so that their operation would not be interrupted.

The heating system in the building was a one pipe steam system. There was no temperature control and most of the piping was exposed. Ventilating in the building consisted mainly of a toilet exhaust system.

The new plan for this building consisted of numerous private offices, many of which had no outside exposure. It was required that each office have individual temperature control, both summer and winter. For this reason a double duct system was chosen. Because of existing ceiling heights, and in order to maintain some existing ceilings, a high pressure system was selected. It was also necessary to convert the one pipe steam system to two pipe steam, in order to control all of the radiation.

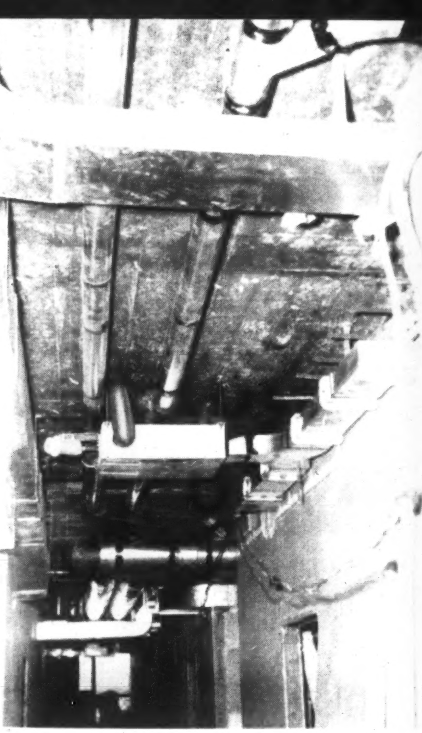


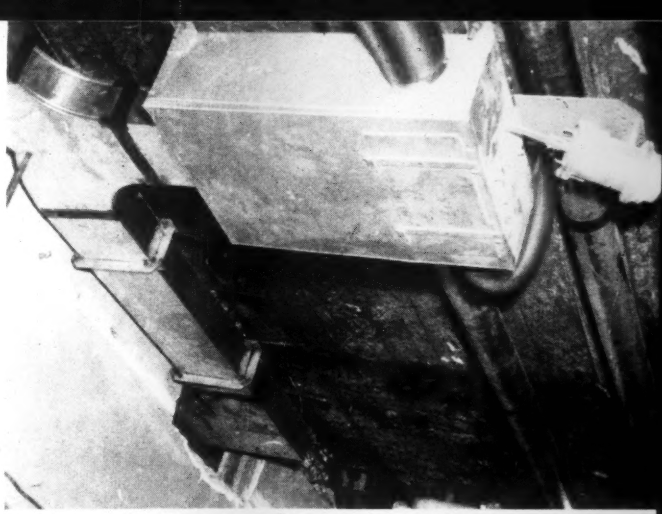
AIR SUPPLY SYSTEM — main hot and cold ducts with sound attenuators shown here — consists entirely of round ductwork. Ducts are insulated with glass fiber insulation, not shown at this stage

Naturally, it was necessary to schedule all work very carefully in order to keep the building heated when necessary, so that the employees' work would not be interrupted. Complete cooperation between owner, contractors, and architect was essential. As is always the case in construction of this kind, unforeseen obstacles cropped up and without the complete cooperation of all parties concerned, the building schedule could never have been made.

Each Building Has Separate Fan System

In designing the double duct system, two supply fan systems were used: one system to handle most of the existing building, and the other supply system to handle the new addition and a portion of the existing building. The thinking behind this was to be able to heat and ventilate and perhaps air condition the new section first, so that when the employees were moved from the existing section to the new section, comfort conditions would be adequate and work could continue in the existing section without interruption. The new section requires no radiation and, therefore, all heating is accomplished with the supply fan system. For that reason, it was necessary that this system be completely installed and in operation





AIR MIXING BOXES in existing building supply mainly high sidewall diffusers; whereas in new section diffusers are all square ceiling type

INDIVIDUAL TEMPERATURE CONTROL is provided for numerous private offices, many of which have no outside exposure

existing office building of the American Dental Association

before moving any employees from the existing building to the new building.

Each system is made up of a preheat coil, and automatic filter, a sprayed coil dehumidifier, and supply fan in the main housing. Then, from the supply fan discharge the hot and cold ducts are taken off, with a reheat coil in the hot duct. This design requires all of the air to be cooled and dehumidified before being introduced into the system. The hot duct in the summer operation carries reheated air. The air supply system is entirely composed of round ductwork. Both hot and cold ducts throughout the building are insulated with a glass fiber insulation.

On the discharge of each fan 40 ft of special sound attenuation ducts are installed. These consist of round sections lined with 2 in. of glass fiber insulation and hardware cloth and the sections are flanged and bolted together.

Each hot and cold duct at the fan discharge contains an automatic damper which is modulated by static pressure controllers located at strategic points in the ductwork. These are installed to maintain static pressure within the duct system, inside the operating limits of the outlet boxes. Ducts were joined, using a special mastic and tape.

The complete system moves 40,000 cfm of air, and in each case the static pressure at the fan is approximately 5½ in. water gage. Velocities do not exceed 3000 fpm. Total capacity is 167 tons of refrigeration.

Enlarge Boiler Room, Install New Boilers

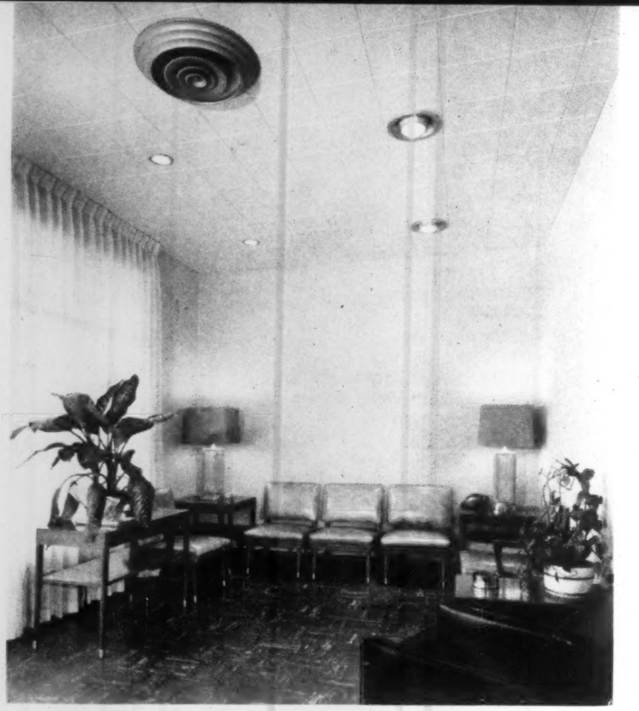
One of the major problems of coordination and scheduling consisted of the complete dismantling and removal of all equipment from the boiler room, the enlarging of this boiler room, which required the pouring of a new slab, and the installation of two new Scotch Marine boilers, together with all oil burning equipment and boiler-feed equipment, and controls, in time to supply heat to the building. This also had to be worked out with the new two pipe steam system.

All air moving equipment, except that supplying the basement area, is in a new penthouse installed on the roof. A low silhouette cooling tower is also installed on the roof. Many air distribution problems were encountered due to many existing ceiling obstacles.

The new section of the building is equipped with square ceiling diffusers almost exclusively. In the existing building, while it was possible to install some ceiling diffusers, in general sidewall diffusers were the only possible means of installation. Some special areas, such as the lobby and the conference room, were designed, using round ceiling outlets above a plastic louvered ceiling.

Since there were numerous rooms and many of them of rectangular shape, it was necessary to supply, in many cases, two or three ceiling diffusers from one sound box. A schedule was made, listing the maximum permissible decibels allowed in each space. It has been our experience that when this is done a considerable savings can be shown, since there are spaces such as IBM rooms, cafeteria, and certain general office spaces where a more liberal sound level is permitted.

After the system was completely balanced and checked, the results proved to be beyond our expectations. Individual room temperatures have been closely maintained and minor air distribution complaints were easily corrected. ⧺



RADIANT CEILING with acoustic control consists of 1 × 2 ft aluminum panels attached to pipe headers and laterals as shown here. Water temperature and flow are controlled by individual room thermostats

"All-in-Ceiling" Heats, Cools

Modular panels, 1 × 2 ft in size, of heavy gage aluminum — spring clipped to 1¼ in. pipe headers and snapped on to ½ in. laterals — form part of the suspended ceiling and radiate or absorb heat, depending on the season. The rate of flow and the temperature of the water is regulated by individual room control. Right above the radiant panels is an acoustic-thermal blanket.

HARPER-WYMAN COMPANY
GENERAL OFFICE

SMALL COMMERCIAL BUILDING, with large and small offices and a research laboratory, is cooled by water in ceiling panel piping kept at about 60 F. A 30 ton chiller is installed in the half basement, which also houses a 620,000 Btu per hr oil fired boiler

Square footage taken up in a relatively small building by chases and ducts required for conventional heating and cooling or air conditioning systems has always been a source of concern to architects. In a small building the demand to utilize every bit of available floor space is very strong, and this was particularly so in the case of the Harper-Wyman Co., Chicago, Ill.

This firm needed additional space for its office and had available for the expansion a plot across the street from the plant. This spot had to allow for the expansion of the office facilities and to provide additional parking space.

Half of the 161 × 125 ft plot was required for parking. This left a small area for the building desired and made it mandatory that extra effort be given to the matter of space utilization. The building was intended to house a variable office force and the entire bookkeeping system of the company, including a variety of IBM and other office machines. Consequently, maximum consideration had to be given to personal comfort; to heating, with avoidance of drafts; to cooling; and to acoustics, since the machines do make some noise, and this would be dis-

BY RALPH STOETZEL, A.I.A.
Ralph Stoetzel
Architects and Engineers

Panel System New Office Building

tracting if uncontrolled. Initial plans called for a basementless building, but this plan was set aside in favor of a small basement at one end of the structure in which all utilities could be centralized. This made an area almost 60 × 25 ft available as additional work space on the main floor.

Panels Save Space

The question was how to get the heat from the boiler to the rooms by the method requiring the least amount of space.

Placing all of the ducts and pipes in the ceiling is sometimes a solution to this problem, but often requires either a reduction in cubage within the building, or a greater floor to floor or floor to roof height than is most desirable economically. Piping in the walls, heating elements in the walls, or heating elements in the room itself all contribute to the reduction of usable floor area, which in this building represented needed space. Also, ducts required for ventilation, regardless of the heating systems used, require additional space.

Therefore, it was decided to employ ceiling panels to combine space saving features with adequate control for both heating and cooling.

Since air is not required to bring heat into the room with this combined panel system, the amount of air introduced is only that required for ventilation. The system moves about 8000 cfm of ventilating air, with five to six complete air changes per hr. In addition to a large supply fan of 9000 cfm capacity, there are five exhaust fans: one large exhaust with a capacity of 4000 cfm; three toilet exhausts with a total capacity of 530 cfm; one other exhaust fan with a 310 cfm capacity.

There is sufficient ductwork and vents to provide a supply outlet and an exhaust in each of the small offices and exhausts only in the toilets. In the large central offices where the clerical work is done, there are several small outlets and two major exhaust vents.

The latent heat load and a portion of the sensible load are removed by the circulating air which is cooled as it passes over coils near the water chiller. The remainder of the sensible load, including that created by the lights, is absorbed by the cooling effect of the ceiling. Water in the ceiling piping is maintained at about 60 F.

The entire cooling load is absorbed by the 30 ton water chiller under design conditions of 95 F dry bulb and 75 F wet bulb. The fluorinated hydrocarbon refrigerant (No. 12) is condensed in an evaporative condenser.

During the heating season the room thermostats remain at constant settings. During the cooling season the system is turned off at night and turned on ½ hr before the work force is due to report.

The heat loss of the building is 620,000 Btu per hr. A conventional hot water boiler with a capacity of 620,000 Btu per hr is used as the primary source of heat.

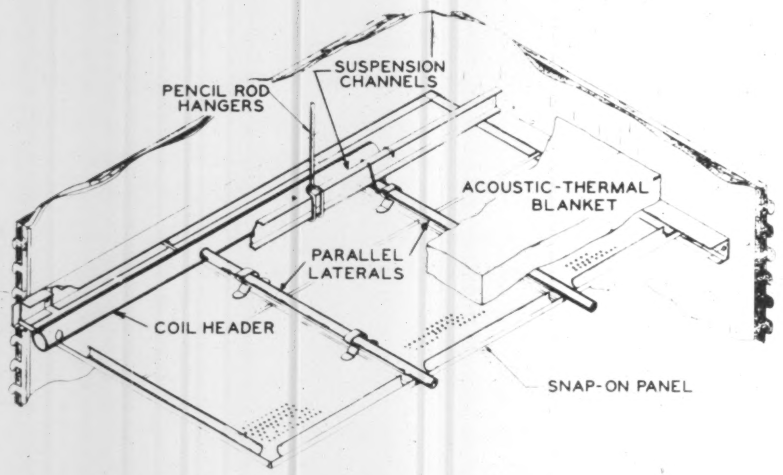
Panels radiate directly into the room being heated. Acoustical and insulating blankets are laid across the tops of the panels and their supports. Air change problems were neither increased or decreased.

Control Each Room Separately

The same panels and liquid flow system are used for both heating and cooling. The panels are perforated and suspended from the ceiling in the same manner as ordinary ceiling materials. Flow of water, whether hot or cold, is determined by conventional type valves, and each room has separate controls. Placement of pipes and panels is also used to control the temperature in various parts of the building.

The suspension system is of pencil rod hangers on 4 ft centers which support 1½ in. channels. The water or liquid coil consists of a grid composed of 1¼ in. diameter headers, which can vary in length, and laterals connecting the headers. Laterals are ordinarily ½ in. pipe, and the metal panels are constructed to be "snapped on" to the laterals. These panels are fabricated of heavy gage aluminum and have a baked enamel finish on the room side. Spring clips are used to attach the grid to the channels. Clips also hold the panels in place.

The acoustic material is placed directly above the panels and actually



VENTILATION AIR totaling 8000 cfm is introduced into rooms via ceiling diffusers to provide five to six air changes per hr. One supply fan and five exhaust fans remove latent heat load and part of sensible load

can rest on them. Those air ducts that are required are placed above the panels, and only one extra layer of insulation is required.

When hot water is run into the headers and through the laterals, the aluminum panels are heated, which in turn radiate heat into the room. When cold water is sent through the headers and laterals, the aluminum panels are cooled and absorb heat from the room. The rate of flow and the temperature of the water can be regulated to achieve the most appropriate balance of radiation or absorption of heat.

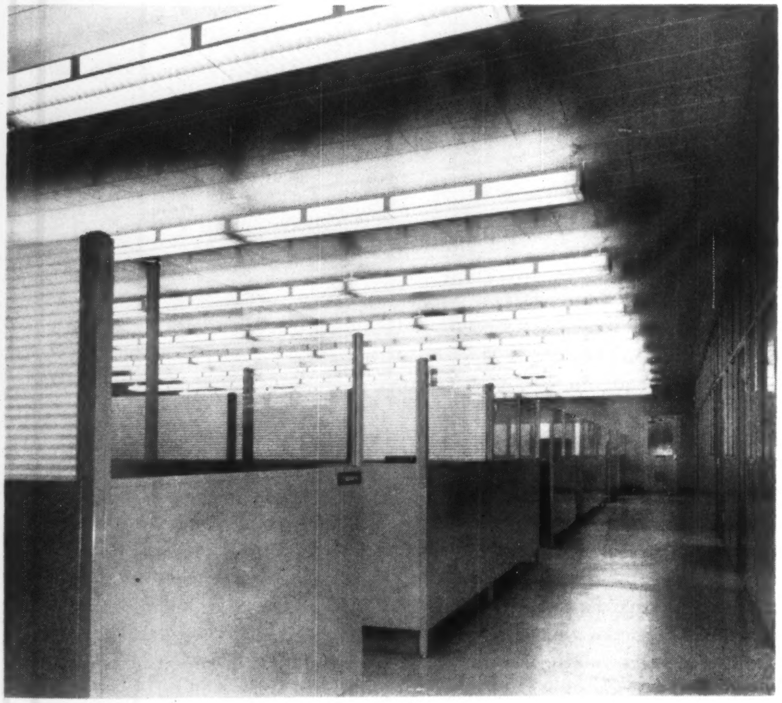
Four Trades Install System

The installation of this system required only four different trades. Except for the actual pipes which have to be fitted, practically all units are modular and prefabricated. A conventional suspended ceiling is installed first. The grid is fabricated in accordance with the engineer's drawings by cutting and welding the pipe. When each grid is completed, it is fastened to the channels with clips, and the 1 × 2 ft panels are, in turn, fastened to the laterals of the grid with spring clips. When grids are small they can be prefabricated at the contractor's shop and the amount of on-site welding held to a minimum. Snap-on clips for both panels and grids are provided by the panel manufacturer.

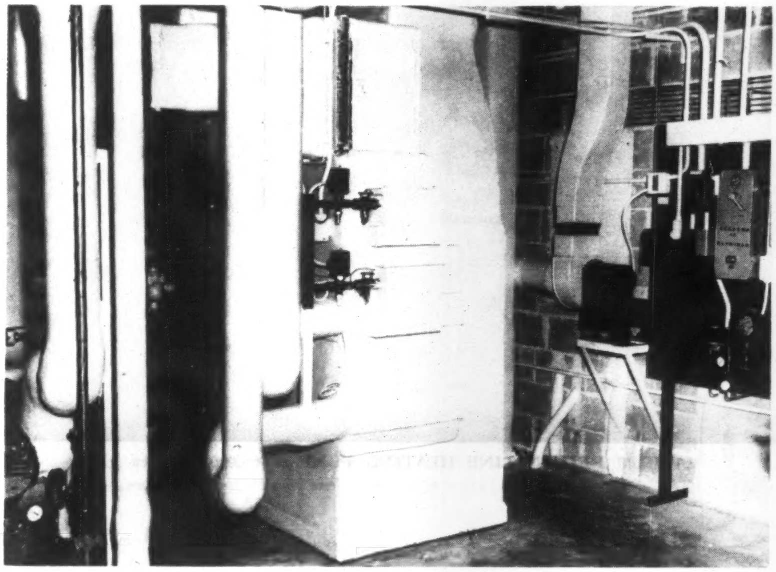
Building Has Six Zones

The building is divided into six control zones, each with its own modulating thermostat which regulates a mixing valve and the temperature of the water in the grids. Temperature in each office can be regulated on an individual basis. Water temperature is controlled by an outdoor regulator which increases or decreases the water temperature at the boiler as the outdoor temperature varies.

In use, the system has proved satisfactory. No drafts have been experienced, and the individual controls have been welcomed by office workers. Maximum square footage of usable space in the small building was obtained. An estimated gain in 2 percent of usable floor space has been achieved with this system. The cost of the combined heating, cooling, and ventilating system was $50,000. This included the ceiling and all insulation in the building. Some additional acoustical baffles were required between the ceiling and the roof, as is typical with metal pan ceilings, which may not have been required with a plasterboard or plaster ceiling. ‡



CEILING PANELS were chosen because they saved space, compared to some other systems, and "seemed to provide adequate control at little or no extra cost"



HUMIDITY CONDITIONING UNIT provides air containing as little moisture as 7 gr per lb to the "dry room" of A. B. Dicks Co.'s testing lab·

Simulate Climate Extremes To Pre-test Products

. . . humidity conditioning used for "dry room"

BY ROBERT HATTIS
Consulting Engineer

CHEMICAL TYPE humidity conditioning is helping A. B. Dick Co., office duplicating equipment manufacturer, Niles, Ill., to design its products to withstand any climate.

Under all conditions, the equipment must work, day after day, without problems of rust or corrosion in metal parts. The supplies must continue fresh and usable for periods of storage.

The program in general calls for subjecting the products to expectable extremes, rather than attempting to pinpoint all actual climate conditions. Thus, if the product performs well at expectable extremes of hot-moist, and hot-dry conditions and also at comfortable temperature-humidity conditions, it will in general perform well at intermediate conditions.

The research set-up includes three separate testing rooms or cells. In one, standard conditions of temperature and humidity (73 F ± 1 F and 50 percent relative humidity ± 1 percent) are maintained by refrigeration air conditioning equipment.

In the second room, high humidity is maintained by injecting steam into the room to determine the effect of damp conditions of long or short duration.

In the third room, dry climates are simulated with the help of continuous automatic equipment which removes any desired percentage of moisture from the air by chemical means. The humidity conditioning equipment maintains conditions ranging from 60 F dry bulb, 7 gr per lb moisture to 73 F DB, 60 gr per lb.

The dry room measures 9 × 18 ft, with a 9 ft ceiling. The equipment maintaining the required conditions uses a lithium chloride base solution to absorb moisture from the air at a controllable rate. The unit exposes the air to be conditioned to a flood of lithium chloride solution in an air washer chamber. The absorption capacity of the solution is a function of its concentration and temperature. Thus, by maintaining a fixed concentration and varying the temperature with standard coolants — fluorinated hydrocarbon refrigerant No. 12 at 12 F in this case — the amount of moisture to be taken from the air can be controlled.

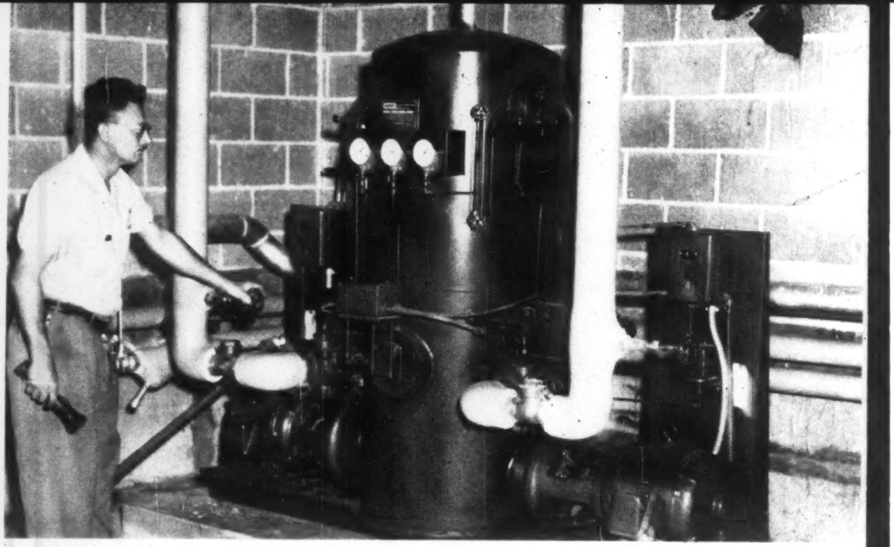
As the solution takes up moisture, it naturally gains in volume. However, a small portion is passed over a steam coil called a regenerator, and when the sump volume increases sufficiently, a float valve admits 25 psig steam to the regenerator, and the moisture is "boiled" out of the solution and carried off in a scavenger air stream. Regeneration of only 10 to 15 percent of the solution serves to maintain the concentration required.

The completely automatic regenerator cycle functions while the air washer section of the unit continues absorbing moisture from the air. There is no need to shut down the unit for defrosting.

At A. B. Dick, air destined for the dry room is already pre-conditioned. It is entirely drawn from a large room giving access to all the test chambers and held at a constant 73 F, 50 percent RH. No air from outside the building is used.

One hundred cfm of this air, containing 62 gr per lb moisture, is mixed with 800 cfm of return air from the dry room at 63 F, 7 gr per lb. The mixture, at a maximum of 64 F, 13 gr per lb, passes through the unit and emerges at 21 F, 4.9 gr per lb. It is then reheated to the desired conditions within the range of 60 to 73 F DB. ‡

When checking a pump in an air conditioning system — or when considering a compressor, fan, blower, or pump for other applications in heating, piping, and air conditioning — a good question to ask is . . .



VACUUM RETURN LINE HEATING PUMP of 65,000 EDR capacity is powered by two 5 hp, 1750 rpm, close coupled pump motors

Does It Have the Right Motor?

BY H. G. NAFE
Manager, Sales Service Section
Century Electric Co.

Here's how to tell. Outlined here are typical applications of electrical motors to integral equipment and components in heating, piping, and air conditioning installations. A previous article on the subject was in the January HPAC.

Hermetic Compressors Use Hermetic Motors Up to 500 Hp in Size

HERMETICALLY sealed compressors are being used at an increased rate for commercial air conditioning applications up to several hundred horsepower. Most of these units are 7½ hp and smaller, and it is in these sizes that the vast majority of hermetic motors are used.

The electric motor is, of course, an important part of the hermetic compressor, and these hermetic motors differ from standard open motors in many respects. The hermetic motor manufacturer furnishes the compressor manufacturer with a wound stator and a rotor. Such motor parts as shafts, bearings, and end brackets are omitted.

During the manufacture of these motors extreme care must be taken to assure that both stator and rotor are free from rust, loose bits of insulation, and oxide that might contaminate the system and cause malfunction of capillary tube unloaders or compressor valve action. All material used in these motors must be carefully processed and inspected to insure the high degree of quality that must be maintained.

Any given motor can be designed specifically for high efficiency, high breakdown torque, minimum size, or minimum cost. Therefore, the design of any motor represents a compromise. A motor design must be based on a satisfactory combination of these various features, with emphasis placed on those features that are particularly important to the application involved. Basically, minimum costs must govern on hermetic motors, but the motor designer must also give much weight to high efficiency, high breakdown torque, and low starting current, all of which are highly important motor characteristics.

While a great majority of the hermetic motors being furnished today are four pole — 1800 rpm — a number of compressor manufacturers are investigating the possibility of using two pole — 3600 rpm — motors on some of their applications; in fact, some 3600 rpm motors are currently being used. A reduction in the size and weight of the motor for a given horsepower rating can be accomplished by using 3600 rpm motors, and this would be a definite advantage on some applications.

The vast majority of hermetic compressors being manufactured today are of the reciprocating type. However, the motor would be essentially the same whether the compressor is reciprocating or rotary.

The National Electrical Manufacturing Association's standard dimensions for hermetic motors make possible quantity production of motors, resulting in a lower manufacturing cost. NEMA has also standardized breakdown torque and locked rotor torque, along with locked rotor current, which assures the compressor manufacturer of receiving motors with these performance characteristics within certain definite figures.

The temperature rise of a hermetic motor depends largely on the method of cooling and the design of the cooling system, which of course is governed by the compressor manufacturer. Therefore, the compressor manufacturer has control of the temperature rise on hermetic motors. Close cooperation is necessary between the hermetic motor manufacturer and the compressor manufacturer on this phase of the application.

Use Single Phase, Polyphase Motors

Both single phase and polyphase motors are used here, with the predominant number of compressors requiring 1/12 hp to 3 hp being single phase. Polyphase motors predominate in sizes 5 hp and larger.

Single phase motors make use of a starting relay to remove the phase winding from the circuit after the compressor has reached a predetermined speed. The motor designer must make sure that the motor curve is such as to permit satisfactory use of a starting relay. If a magnetic type of relay is to be used, the motor design must be such that a sufficient change occurs as the motor comes up to speed, to allow a reasonable tolerance on relay setting. Hot wire relays and other type relays require proper matching between the relay and motor to insure that the start winding is opened after the motor is up to the proper speed. Any relay used here must not remain closed for too long a period. Otherwise, an objectionable noise may result due to having both windings in the circuit, and the starting winding of the motor could be seriously damaged or burned out if the relay remained closed too long. Normal setting is usually about 3 to 5 seconds.

Large Motors Water Cooled

Hermetically sealed motors are being used at an increasing rate in sizes from 50 hp to 400 or 500 hp, to drive centrifugal compressors. These large hermetic motors differ from the smaller hermetic motors discussed above in that they are water cooled, and the motor manufacturer furnishes the shaft and bearings on these particular jobs. The same care must be given, of course, to cleanliness and quality as described for these smaller hermetic motors.

These large hermetic motors usually make use of pressure lubricated sleeve bearings, and special bearing designs are often required to take care of thrust on some of these applications.

How to Apply Motors to Open Type Reciprocating Compressors

Although the use of hermetic motors is steadily increasing, a great many open type reciprocating compressors are used in the air conditioning industry. Compressors of this type find their largest applications in sizes from 10 hp to 150 hp.

When applying a motor to a reciprocating compressor the requirements in terms of starting torque, accelerating torque, breakdown torque, possible motor overloads, type of motor to be used, and methods to be followed in connecting the motor to the line, should be carefully studied.

Unloaders Aid Starting

Starting torque is the torque required to start the compressor and is dependent on friction and the pressure differential across the piston. While high starting torque motors such as capacitor start, high torque, or repulsion start induction run motors may be required on single phase applications, and NEMA design C motors on polyphase applications, many of the present day reciprocating compressors are equipped with unloaders which enable them to be started satisfactorily with normal starting torque induction motors.

Accelerating torque is an important consideration, especially on single phase and synchronous motors, since the compressor manufacturer must be sure that the motor selected will accelerate the compressor to a predetermined speed rapidly in order to insure the repulsion start or capacitor start single phase motors reaching a speed that will remove the starting winding from the circuit before the motor is injured.

In the case of synchronous motors, the accelerating torque must be great enough to pull the connected load up to the speed where it can be pulled into step satisfactorily. The majority of synchronous motors are designed to pull into step from 95 to 97 percent of synchronous speed.

Breakdown torque or pull-out torque as it is sometimes called, is the maximum torque at which the motor can operate without showing an abrupt drop in speed. When the breakdown point of the motor is reached, the current drawn by the motor increases rapidly, and will trip the overload protection in a matter of seconds. Therefore, to assure that these unnecessary overload trip-outs do not occur, the compressor manufacturer should check carefully to see that the motor selected has sufficient breakdown torque to handle the compressor under all conditions of operation.

Since both the starting torque and breakdown torque of the polyphase motor vary as the square of the voltage, the starting torque and breakdown torque required should be figured when the line voltage may be 10 percent below the rated voltage of the motor. If this low voltage condition is not checked, and a slight motor overload should occur at the same time the voltage is low, the motor would draw excessive current and trip the overload relays protecting the motor.

Allow For Temperature Rise

The motors used on these reciprocating compressors can be rather seriously overloaded if the condensing temperature is increased. Some allowance must be made for this factor since bad water in the condensers of reciprocating installations, or an increase in the temperature of the water being used here, can produce a motor overload.

It should be noted that the actual starting torque required by a reciprocating compressor varies greatly with the crank angle setting at the time of starting. It is possible, of course, to have the crank setting in such a position that only a nominal amount of starting torque is required to get the compressor under way. However, at other crank angle settings the starting torque requirements may be very substantial. If the compressor discharge valve should leak while the suction valves remain tightly closed, the amount of starting torque required would be great regardless of the crank angle, since the maximum pressure differential would occur across the piston under this condition.

The trend toward multicylinder high speed compressors reduces the starting torque requirements and makes this feature less of a problem. This is due primarily to the reduction in cylinder size that takes place, which of course, reduces the gas pressure the motor must work against.

Centrifugal Compressors Have No Starting Torque Problem

Since the refrigeration system on a centrifugal compressor is equalized between the high and low sides prior to starting, there is no problem with starting torque on compressors of this type.

The pull-in torque problems involved here are much more severe than with a reciprocating compressor due to the high WK^2 of the impellers used on some applications, and the length of time it takes the motor to bring the compressor up to its operating speed becomes increasingly important. The motor manufacturer should be advised as to just what the WK^2 load at the motor shaft will be on these applications so that a motor can be supplied that will have sufficient pull-in torque to bring the compressor up to speed in a reasonable time.

What Happens When Gas Density Changes

The fan laws that we are all familiar with of course state that on a balanced system the cfm delivered by the fan will be directly proportional to the speed, the resistance pressure will vary as the square of the speed, and the hp as the cube of this speed. This statement is true, providing the density of the gas being handled does not change during the operating cycle.

In the case of a centrifugal refrigeration compressor the gas density does change during the operating cycle, and the torque requirements do not always follow the fan laws listed above.

This is an important consideration and should be carefully considered when wound rotor induction motors are used in conjunction with centrifugal compressors. The proper starting resistors must be selected to keep the motor torque great enough throughout the acceleration period to assure the motor accelerating the compressor up to its rated speed.

Centrifugal compressors are used in a range from 50 hp up to several thousand hp, with a rotating speed range for fluorinated hydrocarbon refrigerants from as low as 2800 rpm to as high as 9000 rpm, depending upon the compressor size and the type of application.

Fans and Blowers Require Quiet Motors and Smoother Starts

Centrifugal fans or blowers, as they are sometimes called, are used in a variety of types and sizes. These centrifugal fans are designed to move air over a wide volume range. Static pressures go up to 25 in. water gage. The blower wheel itself may have straight, forward curve, backward curve, or other type blades.

The motors used to drive these centrifugal fans should be selected to start and accelerate the fan smoothly without undue starting noise and belt squeak. They should be quiet and give the ultimate user trouble free operation.

Selfcontained air conditioning units make use of fan motors ranging in size from 1/30 hp to 15 hp. Room air conditioning units use fan motors ranging from 1/30 hp to 1/3 hp. In the commercial package selfcontained units, the fan sizes are extended up through 3 hp and higher.

Since the operating conditions under which these motors run vary, depending on unit arrangement and location, the fan motors involved are almost always in contact with the air being moved. When used on evaporator service, they are running in clean, dehumidified air, varying in temperature from 40 to 80 F, while on condenser service the air coming in contact with the motor

"Special mechanical construction of the motor is sometimes necessary to assure that the motor interior is properly protected from the moisture with which it must sometimes come in contact. The motor manufacturer should be advised of any unusual problems involved in specific applications."

would have normal atmospheric contamination, which includes relative humidity up to 90 percent or higher, water spray, salt particles, dust, and smoke.

Since one of the most important requirements of these motors is quietness, sleeve bearing motors making use of some type of resilient mounting are normally selected.

Many Centrifugal Fans Are Direct Driven

An increased number of centrifugal fans being used make use of direct drive. On these particular units the blower wheel is mounted on the motor shaft, and this motor-blower assembly is mounted on the blower housing. This eliminates the need for pulleys, belts, and blower wheel bearings.

A so-called "inside out" motor has recently been developed. The motor shell becomes the rotating member on which the blower manufacturer mounts his blower wheel. The motor field winding is mounted on the motor shaft and is stationary. This shaft is mounted on brackets which are supported by the blower housing. From the range of sizes available, the motors of this type today are somewhat limited and range from 25 millihorsepower up to about 1/3 hp at 1200 rpm.

Propeller fans find wide use in space ventilation where air must be moved at low pressure or under free delivery conditions, and on many applications the propeller fan is mounted directly on the motor shaft, although propeller fans requiring motors 3/4 hp and larger or slow operating speeds are usually belt driven.

Many air moving devices such as unit heaters, ventilating fans operating under low static pressures, and condenser fans on some types of refrigeration equipment make use of propeller type fans.

While no definite line exists between fans, blowers, and compressors, in general units for low static pressure make use of propeller fans. Blowers usually run in the middle pressures, while compressors are used for high pressure applications.

It should be remembered that any variation in fan speed, fan size, fan weight, or air density requires a recheck on the size of motor to be used, since a change in any one or more of these items, can materially affect the horsepower rating of the motor required to handle the application satisfactorily.

Axial flow fans are frequently used in the heating, ventilating, and air conditioning field in sizes from ½ hp through 150 hp. It should be noted that the popularity of this type of fan has grown considerably over the past few years.

Pump Selection Depends on Many Factors

Heating, piping, and air conditioning systems make use of a wide variety of pumps, and a selection of the proper pump for any application is dependent upon many factors. These governing factors include such things as density, temperature, viscosity of the liquid, and whether the liquid being pumped is clear or contains abrasive or corrosive material.

Up to 300 Hp Motors Used

Air conditioning systems make use of pumps for the circulation of chilled water, brine, and condenser water. They are also often used in conjunction with cooling towers. The pumps used on these applications are largely centrifugal units, and on some applications motor horsepowers up to about 300 hp are required, although the vast majority of pumps used for these applications are in the fractional and small integral horsepower sizes.

Boilerfeed pumps, condensate return and vacuum heating pumps, pumps for forced hot water systems, and fuel oil burner pumps are commonly required on heating applications.

Centrifugal pumps are used for these applications, with the exception of the fuel oil burner pumps, which are generally of the rotary type.

Motor Should Withstand Elements

The motors required for these various pump applications are usually normal starting torque, since centrifugal pumps present no appreciable starting torque requirements. The motor should be built to withstand the elements if they are to be operated outdoors without any type of protection, and splashproof or totally enclosed motors are often required on some of these applications. ≠

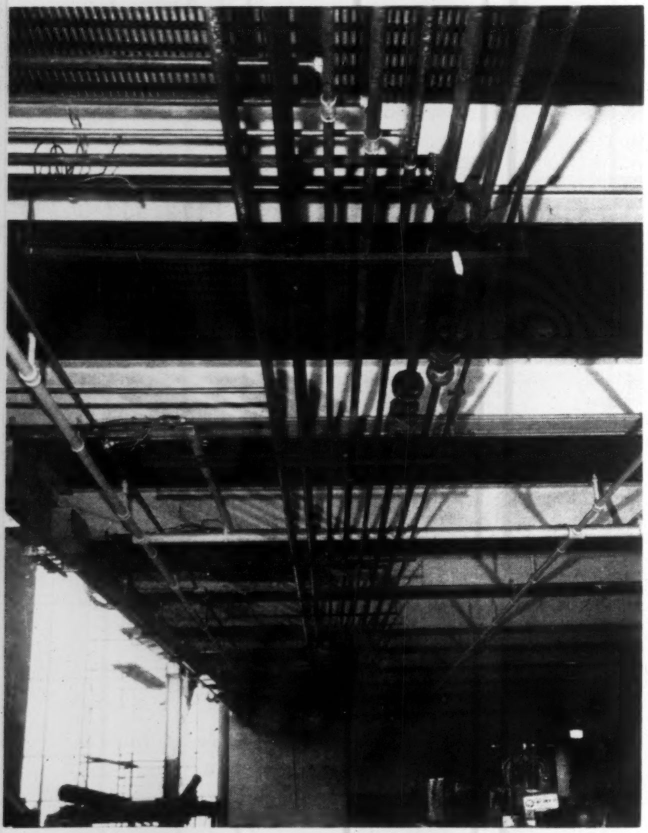
SERVICE PIPE LINES are installed in the crawl space of the laboratory building. The support racks were drawn up and pre-fabricated before installation

NEW LABORATORY houses a complete pilot plant for small scale plant testing in addition to 25 fully equipped laboratory positions and several offices

Lab Facilities Centralized

Complete facilities for laboratories, a pilot plant, and offices include an intricate system of process piping, multizone perimeter and interior air conditioning, and multiplant heating

BY EDWARD GREENWALD
Chief Project Engineer
Charles Simkin & Sons, Inc.



HUNG FROM CEILING CROSSBEAMS, these pipe lines supply laboratory tables with high pressure air at 100 psig, low pressure air at 20 psig, low and high pressure natural gas, low and high pressure steam, 28 in. vacuum, hot and cold water and drainage

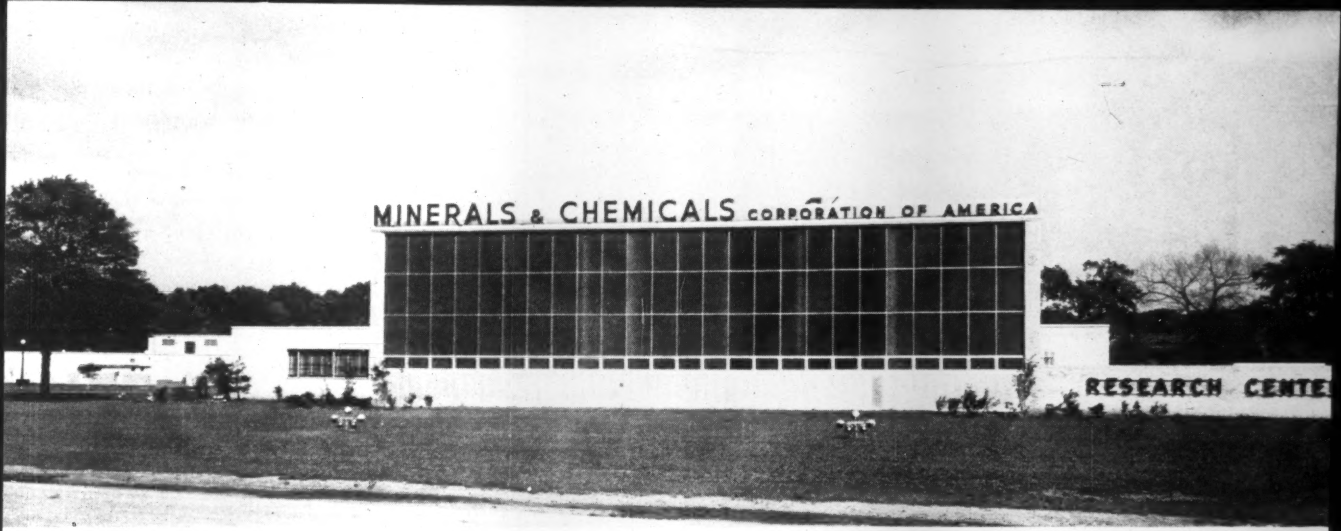
To CONSOLIDATE its research, development, and executive sections, the Minerals & Chemicals Corp. of America has established a new 69,000 sq ft industrial center in Menlo Park, N. J.

Research facilities, specialized equipment, and control devices for testing mineral ores and raw materials, are unusually elaborate. Consequently, supply and disposal piping systems are exceptionally complicated. Laboratory table service piping such as high and low pressure air, electric power, natural gas, steam, and superheated steam as well as hot and cold water had to be installed through narrow corridors to over 25 closely packed stations.

The timetable called for "progressive completion" to ready sections for tenancy and operation while remaining portions were still in the building stage. The company could not permit total suspension of critical research projects until the entire plant and its facilities were done. This meant a carefully coordinated construction plan and close supervision to adhere to it. Ductwork, piping, and equipment were installed without interfering with the simultaneous erection of floors, walls, and partitions.

Large Amount of Piping Installed

An immense amount of utilities, conduits, ducts, and process piping lies suspended in a narrow crawl space between the laboratory and subflooring of the building. The support racks were drawn up and prefabricated before installation. Preshaped channels with clamps were carefully premarked in accordance with a precisely



To Speed Research

scheduled installation timetable to avoid the confusion and lost motion.

Essential workboard services for laboratory tables are supplied in the following manner:

- *Process steam.* High and low pressure steam tapped from a 200 psig line and reduced to proper handling pressures by automatic regulators.
- *Superheat.* Three electric superheaters installed in the micronizer and controlled perculation rooms can boost process steam—at 150 psig—to 1000 F when pilot plant tests are conducted. The dry steam production scale is graduated upward from 100 F.
- *Compressed Air.* Two vertical, duplex water cooled, single stage air compressors for 40 psig, and similar units for 100 psig offer ample capacity.
- *Vacuum.* A duplex vacuum pump unit for laboratory service includes a tank for automatic control and other standard accessories. Each pump is of the rotary liquid seal displacement type for producing a continuous flow without pulsation. Each pump has an actual capacity of 90 cfm at 20 in. Hg vacuum.
- *Gas.* High pressure natural gas is tapped into the fan room and lab building from a commercial main.
- *Water.* Hot and cold water, controlled by automatic pressure regulators, feed into all laboratory stations.

Three Package Generators Supply Steam

General space heating throughout the plant is supplied by low 125 hp steam generators of the Scotch marine type. Thermostatically controlled heat is delivered via finned tube radiation, with individual temperature regulators, and via miscellaneous unit heaters wherever the specific need for a supplementary source appears. Baseboard radiation through laboratory areas distributing 190 F water is linked to an automatic electro-pneumatic control system.

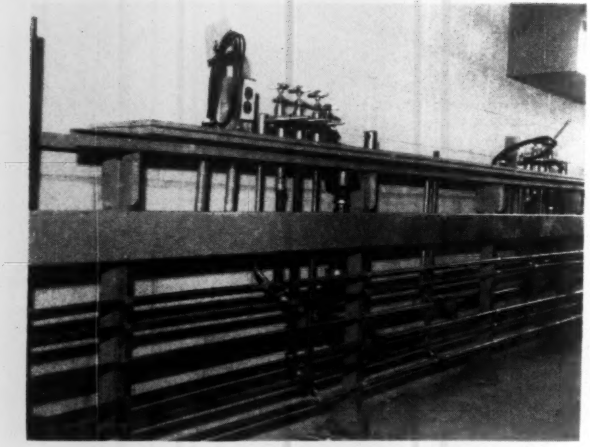
The two oil fired 15 psig steam generators and one 20 hp, gas fired, 200 psig unit, produce 690 lb of steam per hr for process work. All three units are automatic packaged systems, designed to fire No. 6 bunker oil. An automatic float type low-water cut-off, an electric type cut-off, and boilerfeed pump controls are integral with these boilers. Approved horizontal rotary cup burners provide automatic gas-electric ignition and are protected with electric eye auxiliaries. Each burner is controlled with a modulating pressure control, break-glass emergency switch, and fire alarm.

Fuel pumps and two-heater sets have a total capacity of 175 gph. This pre-assembled package is sized for a 60 F temperature rise and is so piped that either, neither one, or both heaters may be used. Either heater may be removed without interfering with the operation of the unit. Continuous fuel supply is thus preserved. In the event of partial failure, an emergency electric heater rated for a 45 F rise can be switched into operation.

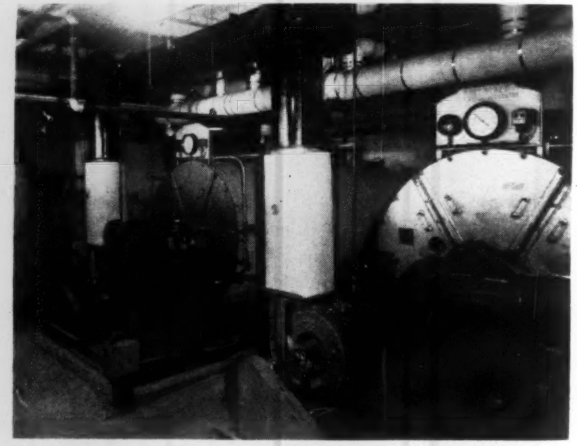
Ventilating System Has Special Features

Nearly all air handling units in the high capacity ventilating system in the laboratory work areas are furnished with combination filter sections and mixing boxes; filters are classed as permanent and cleanable. Filtered outdoor air is diffused uniformly without draft or noise in proportional volumes, and controlled manual dampers. A built-in, positive, full closing air volume damper calibrated for direct control insures this. Excess air pressure is relieved through gravity roof ventilators of the stationary type.

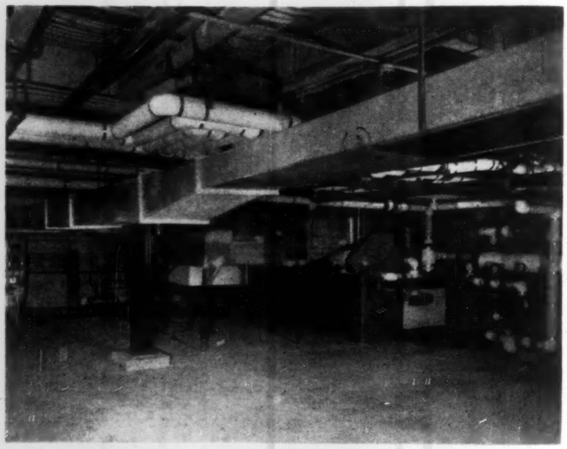
Thirty-seven oversized roof fans for the removal of stale room air through a system of cement-asbestos ducts are, in part, equipped with nonsparking wheels and explosion proof motors and disconnect switches. Some "coated" motors are gas proofed by sealing off motor compartments with lead wool packing glands on fan



WALL MOUNTED PIPING — complicated and closely spaced — leads to laboratory tables. Piping is spaced so no lines can be confused with other lines



PROCESS STEAM — 690 lb per hr — is produced by two 125 hp, 15 psig, oil fired boilers and one 20 hp, 200 psig, gas fired boiler



AIR CONDITIONING and heating units and converter are in basement equipment room. Constant 73 F temperature and 50 percent relative humidity are maintained

shafts, junction boxes, and cementing the top plate to the frame.

Wherever the slightest danger of volatile emissions exists, electrical equipment is protected and sealed to prevent ignition by incidental sparks. A liquid neoprene coating on special mounting pedestals and fans also insures that fan wheels, inlet rings, motor support plates, and discharge aprons will not be eroded or scored by corrosive exhaust.

A special dust exhauster and separator designed for the grinding room in the laboratory building consists of a water spray dynamic precipitator and auxiliaries, with a total capacity of 1200 cfm. A total of seven flexible branch ducts and hood assemblies radiate from it. This installation includes air tight, braced and vibrationless steel ductwork, copper ductwork, stainless steel canopies and fume hood exhaust ducts.

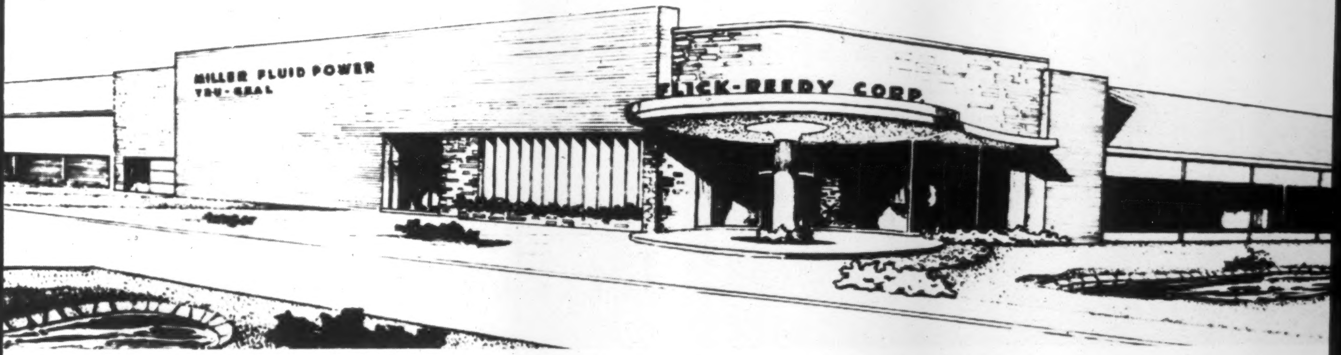
Throughout the plant areas, firm control over internal temperatures is maintained through an integrated system of automatic switches and relays activated by master thermostats and stop timers. Outdoor temperatures determine the circulation rate of hot water through radiation coils. All thermostats operate on a change of ± 1 F at the thermostat location. In each zone, a modulating steam coil is controlled by a submaster thermostat reset on an outdoor master thermostat, so that coil discharge temperatures vary from minimum to maximum in step with outdoor variations from 65 F to zero F.

A constant temperature and humidity room in the laboratory building is maintained at an undeviating 73 F and 50 percent relative humidity. A room thermostat positions the modulating cooling coil face and bypass dampers to accurately maintain space temperature. An electronic room humidistat, brought through an electronic panel, schedules a steam valve to the pan humidifier on a drop of humidity. The refrigeration thus begins a dehumidification cycle. If the room temperature drops when the refrigeration is applied to dehumidify, the electronic room thermostat in conjunction with the discharge controller, opens the steam reheat valve to maintain space dry bulb temperatures.

Multizone Units Condition Offices

The hot water heating system for the executive office buildings is similar to the system installed in the laboratory. The control arrangements for both heating and ventilating systems provide for night time temperature-turndown and damper closure with a weekend skip. Morning pickup and damper regulation is automatically accomplished.

Most of the executive suites are equipped with multizone air conditioning, heating, and ventilating units for a total of seven zones. One of these zones is served by perimeter air conditioning units with individual thermostatic control. The main section of the office building is cooled by means of three multizone air conditioning units. Chilled water is supplied to this building by two 37 ton package chillers, each driven by a 40 hp motor. ⌗



UNUSUAL SYSTEM for this 220,000 sq ft plant will operate in several stages on the compound compression reverse cycle refrigeration principle. The heat source will be air and the cooling source will be rainfall that collects in two man made lagoons

Multistage Heat Pump To Heat And Air Condition New Plant

. . . largest installation of its kind in the U.S.

UNDER CONSTRUCTION near Chicago is a $2,300,000 plant that will be heated by cold air in winter and cooled by rainfall in summer.

The 220,000 sq ft ultramodern building, in Bensenville, Ill., will house the Flick-Reedy Corp., which makes industrial hydraulic and air cylinders. It is expected to be completed by late fall.

A 640 ton heat pump in the new structure will squeeze the heat out of a 250,000 cfm of winter air to keep interior temperature at 70 F even when it's −10 F outside. It will be reversed in summer to air condition nearly 220,000 sq ft of office and factory. The installation is the first of its kind in the Midwest.

The multistage heat pump system contains compressors, interior cooler-condenser units, and outside air heat exchangers. Medium for the exchange of heat between the system and the outside air is fluorinated hydrocarbon refrigerant No. 12.

Absorbs Heat from Water, Air

In summer, the liquid refrigerant evaporates and absorbs heat from water flowing through tubes in the cooler-condenser. This chilled water is then circulated through cooling coils that remove heat from air blown over them. For winter operation, cold outside air passes over refrigerant evaporator coils in the heat exchanger. Since the temperature of the refrigerant in the coils is below that of the air, it absorbs heat. Compressors raise the temperature and pressure of the refrigerant gas to the point where it condenses in the cooler-condenser. This produces sufficient hot water for comfortable indirect heating of air blown over the heating coils.

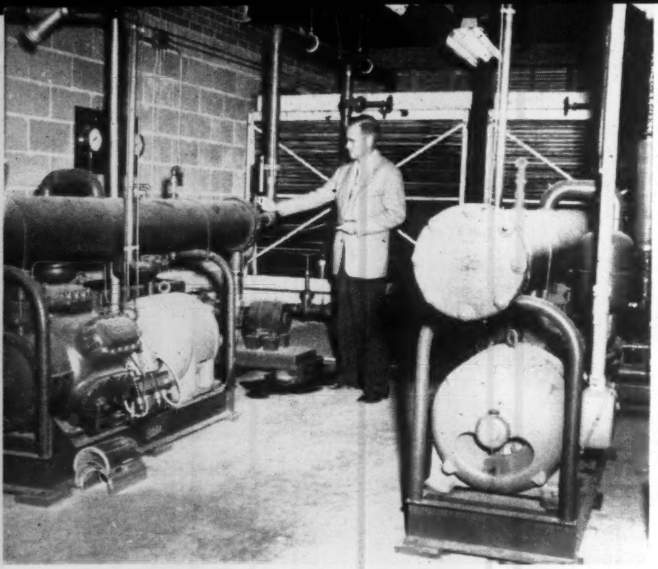
Collect Rainfall in Lagoons

Rainfall, to be collected in two man made lagoons, will provide the water needed for the operation of the air conditioning equipment plus other industrial uses. Drainage from 10 acres of roof and parking area will feed the lagoons. Each lagoon will be 75 ft wide, 500 ft long, and 7 ft deep.

The heat pump is the largest installation of its kind in the U.S. to use air as its heat source.

The heating and air conditioning engineering and contracting is being done by the York Corp. The architect for the building is Zay Smith and Associates. ‡

Two similar installations are described in an article published in the June 1956 HPAC, page 105.



TWO 40 TON COMPRESSORS are part of primary circuit, as are a direct expansion chiller (not shown), a primary chilled water pump, two condenser water pumps, two induced draft cooling towers (rear), interconnecting piping, and controls

Chilled Water Cools Jet Fuel System Test Machines

BY ROSS ZUMWALT
Consulting Engineer

. . . for 'round the clock testing of fuel systems in air force jet engines. 100 gpm of water chilled in a two circuit, 80 ton refrigeration system is pumped through coils of 11 test machines to control fuel temperature. Program and safety controls are bolstered by a low temperature safety cutout that turns the entire system off when water temperature reaches 38 F.

When the Southwest Airmotive Co. of Dallas recently landed the country's first civilian contract for overhaul of U.S. Air Force jet engines, the company was already famous for its rapidly executed engineering maneuvers at the 23 year old aircraft service center. In the new jet program, Southwest Airmotive was challenged again.

"We don't have much time," said George Kelley, SAC's plant facilities engineer, when he phoned me. "We need a water refrigerant system to cool down 100 gals of water per minute for 11 jet fuel system testing machines. The system has to be designed, built, and in operation in 150 days." That was the company's deadline for testing its first jet engine.

At a quick coffee shop conference with Mr. Kelley, I began to take hurried notes on a paper napkin. The basic function of the system would be to cool the water, pipe it into the test area and through the coils of 11 jet fuel system testing machines, where it was to control the fuel temperature. Then it would be piped in for recooling, and back into the machines.

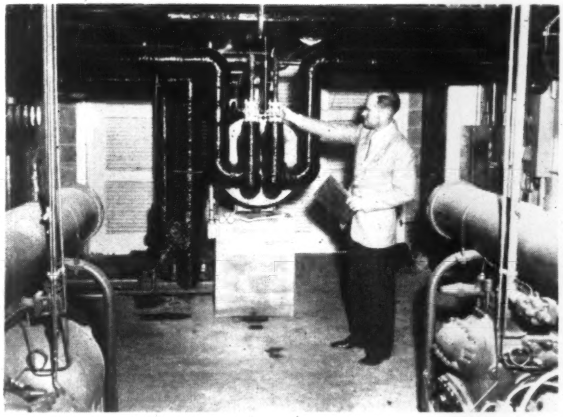
Then the plant facilities engineer listed the various component machines, the number of gallons per minute to go through them, and the temperature rise of the water through each machine itself. The combined totals of this — plus slight allowances for expansions — dictated the basic sizing of the equipment. Because of the highly combustible fuel to be used, extreme safety precautions were a necessary factor in the system's design.

From my preliminary notes, I wrote up the specifications of the system components and made a schematic piping diagram.

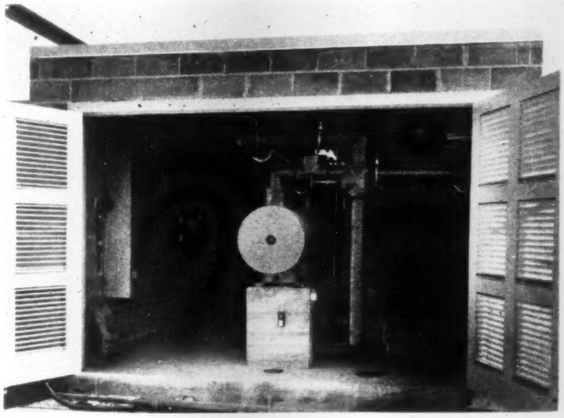
Choose Two Circuits for Adaptability

Because of the diversity that might be occasioned, a two circuit system was selected as being the most adaptable to meet the system's requirements. Since it was to be in operation day and night, summer and winter, it was equipped with control devices for such operation.

The primary part of the system consists of two condensing units, a two circuit direct expansion chiller, a primary chilled water pump, two condensing water pumps, two induced draft cooling towers, and the necessary interconnecting piping and controls to maintain a constant temperature water supply in the circulating system and to enable continuous use of the towers. The primary system is controlled by applying refrigeration as required to balance the load.



THERMOSTATIC EXPANSION VALVES which feed separate circuits of the two circuit chiller are checked by Larry Gilbert, who supervised system's installation. All piping is insulated with thick, heavy duty cork



EQUIPMENT ROOM, 4 ft from test area, is of explosion proof block and brick construction. Fans in cooling towers at rear pull air through louvered doors and circulate it through the room

The secondary system consists of a secondary water pump and automatic mixing valve to maintain constant water temperature, leaving the assembly on the equipment side the necessary piping to supply and return water to the various equipment items.

The system has two 10 ton water chillers, and a total of 480 ft of 3⅛ in. hard drawn copper tubing comprising the chilled water circuit. All of its chilled water lines, the refrigerant suction lines, and the refrigerant heat exchangers are insulated with heavy duty, ice water thickness cork. The water chiller itself is insulated with 3 in. vegetable cork board.

A pneumatic control system governs the temperature of the water and positions a thermostatically controlled water mixing valve. As an additional safety measure, a low temperature safety cutout is used to control the entire system. In the event that the control system, or any other, should fail, this cutout turns the entire system off when the water temperature reaches 38 F.

In winter, when fans aren't needed in the cooling towers, two condenser water thermostats are used to automatically cut the fans off and maintain 80 F water. In the engine room, thermometers are mounted to keep a constant record of water temperature, both in chilled and condenser water sections. Pressure gages keep constant record of the water pressure at the pumps, the chiller, and in the chilled water supply lines.

Four water pumps are used: Two 2 hp condensing water pumps, rated to deliver 120 gpm at a 30 ft head, to recirculate the water from the cooling towers through the water cooled condensers; a 2 hp pump, rated to deliver 100 gpm at a 30 ft head, to recirculate the water through the chiller in conjunction with the thermostatically controlled water mixing valve; and a 10 hp pump, rated to deliver 100 gpm at 140 ft head, to circulate the chilled water from the chiller, through the testing machines, and back to the chiller.

The refrigeration compressors are water cooling machines with a capacity of 38.2 tons at 40 F suction and 105 F condensing temperature when supplied with 120 gpm of 85 F water. Each of these condensing units is equipped with a 40 hp, 220 volt, 60 cycle, three phase electric motor. The units also include gas mufflers, three step capacity unloaders, high-low pressure cutout, oil pressure switches, and electric crank case heaters.

Control Sequence Is Automatic

The entire electrical system is interlocked so that the following sequence of control is automatically obtained: When the primary chilled water pump is started, the secondary chilled water pump also starts and the capacity controller is energized. The capacity controller then starts or stops either or both of the compressors according to the specified program. Each compressor starts and stops its respective condensing water pump as it starts and stops. In turn, the condensing water pumps start and stop their respective cooling tower fans, except that the low limit thermostat circuits for the fans do not allow the fans to start if the condensing water temperature is below the prescribed limit.

A number of extreme safety measures were employed in the system's construction. The refrigeration room is an explosion proof building of block and brick construction, set 4 ft from the test area. The fuel testing machine room is ventilated at all times, and return air ducts remove fumes from the room at each corner.

Although the machines called for in the plans were not unusual, the size of the system was, and most of the equipment used had to be "custom built."

Seven men assembled the equipment in record breaking time. The heating, piping, and air conditioning contractor was Hoppe Refrigeration and Air Conditioning Corp. #

Acres of rooms and areas to serve widely differing functions challenged heating and air conditioning design in this $8 million medical center unit in a "mild" climate

New Cancer Research Hospital Has Separate Heating-Cooling Systems

- **Three separate chilled water circulating systems serve the interior spaces, research wing, and nursing wing. Three double duct central systems mainly serve administrative offices in the three zones. Central type vertical floor mounted or horizontal ceiling suspended units serve several single zone service areas. An individual room air conditioning unit is installed in each research room.**

- **General heating is by hot water circulating through coils in the air handling units of three zones designed on a basis similar to the chilled water zoning. Perimeter baseboard hot water radiation — hot water floor panels on one floor — heat patients' rooms, which have window walls.**

THE ENGINEERING WORK in connection with the design of the air conditioning systems for the new M. D. Anderson hospital for cancer research, Houston, was a challenge. The proposed layout included literally acres of inside areas, as well as outside rooms, dedicated to many varied occupancies and functions, some of which were rather indefinite in scope, due to the very nature of the research program that was contemplated by the hospital staff.

The easy way out would have been to overdesign for any possible load

BY W. M. ANDREWS
Lockwood, Andrews & Newnam
Consulting Engineers

or occupancy in every space; this would of course have resulted in prohibitive installation costs. The design was therefore predicted upon the best information available from the architects and the hospital staff, and every effort was exerted to attain an economical installation.

Houston has a relatively mild climate, and even though 20 F or 25 F is generally accepted as the outside winter design temperature, we have not had a temperature that low in over five years. Thus, even though our heating systems must be capable of handling these temperatures, we actually experience much higher temperatures the greater part of the time, such that we are actually faced with operating the cooling systems in most of our buildings some days in all months of the year. We spend by far the greater part of our time in the temperature range midway between the heating design temperature and the cooling design temperature.

Each space in the hospital was analyzed to determine its probable requirements in total time for heating and for cooling. It was recognized that a large number of the internal rooms, surrounded with heated spaces, and having internal loads from people and lights, would actually require some cooling practically the entire time. It was not feasible to attempt to increase the outside air being supplied to such areas on a drop in outside temperature, because of the many variables involved. And it would have also left the big problem of excessive humidity, which is the one nasty thing that can be said of Houston's climate.

Design Cooling, Heating Zones

In the final design, three separate chilled water circulating systems, or zones, were employed, served by three separate chilled water pumps, with a fourth pump installed to serve as a standby unit to any of the others. These zones were selected on the basis of similar cooling time requirements mentioned above.

The chilled water requirements are supplied by two electric motor driven centrifugal compressor units in the main mechanical room at the basement level. Unit No. 1 has a 700 hp motor, and Unit No. 2 has a 350 hp motor. Each unit is equipped with a five step speed capacity controller plus suction dampers of the prerotation type controlled from the chilled water temperature. Each of these units produces approximately 1 ton of refrigeration per bhp, with a chilled water temperature range of 50 F to 42 F, and a condensing water temperature range 86.0 F to 93.5 F.

Heating of the building is accomplished generally by means of hot water circulating through hot water coils in the air units, except for the nursing wing. The large expanse of glass in the patients room dictated the use of baseboard radiation along the outside wall below these windows on all floors except the second floor, where the glass extends to the floor. Here, hot water radiant coils were cast in the floor just inside of these windows to prevent the cold air dropping down from the glass areas and causing cold floors during the "winter" in Houston.

Zoning Cut Operating Costs

The hot water circulating system, designed on a basis similar to the chilled water zoning, has three circulating systems or zones. Zone No. 1 operates the least part of the time in serving the interior zone units. Zone No. 2 operates more of the time in serving the laboratory wing and other exterior zones. Zone No. 3 operates during the longest period of time in serving the nursing wing. Thus it is not required to operate all of the systems continuously and bear the cost of pumping hot water to the units which do not require any heating, as is the case with chilled water. A fourth hot water circulating pump is provided to act as a standby unit to any one of the others.

The hot water requirements for heating are supplied from two steam to hot water converters in the main equipment room. One of these supplies hot water for all air units having heating coils; the other supplies hot water for the baseboard and radiant heating in the nursing wing. The steam required for this heating as well as for all other purposes such as domestic hot water, laboratory use, stills, and the laundry, is furnished by one of two factory assembled, water tube, gas fired boilers of 23,000 lb per hr capacity, at 125 psig.

Equipment Room Below Grade

The hospital building, is generally T-shaped, with the nursing wing six floors high, and approximately 335 ft long across the top of the tee. The many offices, examination rooms, treatment rooms, etc. are in the stem of the tee, five stories high, which varies in width throughout its length on the lower floors. The research wing, five stories high, projects out from the stem of the tee parallel to the nursing wing about 120 ft.

The mechanical equipment room is partially below grade at the lower end of the tee, which is approximately 270 ft from the nursing wing. Pipe tunnels are provided from the main equipment room to the entire building, and are approximately in the center of the stem and the center of the nursing wings across the tee. The Betatron unit is below grade adjacent to the mechanical room. The animal room, laundry, and certain other facilities are in the partial basement in this general vicinity.

Conditioned air units are on various floors throughout a large area of the building, the nearest units being adjacent to the equipment room, and the farthest units being about 500 ft from the source of supply.

Use Reverse Return Water Flow

Thus, the problem of water distribution and supply of the proper amount to each of the units required an extensive study. After a thorough hydraulic analysis of the entire system, it was concluded that the only insurance of getting proper distribution under varying flows would be the use of a reverse return system throughout the entire hospital. All of the chilled water and the hot water systems were consequently designed on this basis, with the supplies being taken to the farthest point from the pumps and serving the units there first and thence progressively back toward the equipment room; the return systems were started at this farthest unit and progressively pick up returns from the units as it goes back to the equipment room.

The entire system is designed to operate without the use of any valves in the system for the purpose of balancing the water flow. In actual practice, the entire system has performed remarkably well, and only one air conditioner failed to get the required amount of water for cooling and heating in the initial operation; this was subsequently corrected by changing one branch line size. The chilled water and hot water lines are separate throughout, with no interconnections; there are no coils used for both heating and cooling.

Install 333 Air Units

Due to the great numbers of rooms and areas with varying requirements of cooling, heating, ventilation, and humidity control, no one type of air unit was selected or designed to handle all problems. There are a total of 333 air units installed, including 180 units in the nursing wing, all of which have chilled water or hot water coils, or both. Particular care was taken to select the most economical type of unit required to meet the demands.

The air conditioning units are of three general classifications. The first classification includes the Type *A* and *B* units which are central zone type units serving a single area of a number of rooms or spaces having similar air conditioning load characteristics. The second classification includes all Type *C, D, E, F, G*, and *H* units, which in general serve the room in which they are installed, except of course the Type *H* units for the operating rooms, which are installed in mechanical rooms adjacent to the conditioned room. The three Type *J* units constitute the third classification; these systems are of the central double duct type, which serve a number of rooms or areas which have completely different load characteristics, to the extent that one room may require heating while the adjacent room requires cooling.

No Air Is Recirculated

There is a separate unit with individual control in each room of the nursing wing. These are very low velocity units. Conditioned outdoor air is supplied to all these units through a dehumidifying unit, followed by a cooling coil and a heating coil for proper temperature control. None of the air is recirculated between rooms; the excess air is removed by an exhaust system. Because of low window sills in these rooms, these units are all mounted above a section of suspended ceiling in the room, adjacent to the corridor, and employ ceiling type air diffusers in the rooms. The individual unit for each room permits the unit to be shut off completely when the room is not occupied.

All of these Type *C* units for the third through sixth floors have only chilled water coils. The heating requirements are supplied by the baseboard radiation, with the outdoor air supply being heated to eliminate "drafty" conditions. A room type thermostat operates a pneumatic throttling valve for the baseboard radiation for heating and a three way chilled water mixing valve for cooling, for automatic summer-winter changeover. All of the Type *D* units for the second floor private patient rooms are identical to the Type *C*, except that a heating coil is added to the unit in the reheat position for secondary heating. A similar room type thermostat controls a three way hot water valve for the heating coil, a pneumatic throttling valve for the radiant floor panel heating, and a three way chilled water valve for the cooling coil.

Dehumidify All Outdoor Air

All outdoor air is dehumidified, as previously mentioned for humidity control. Even though these coils condense only a small amount of moisture from the room air, a separate condensate collection and drain system is installed.

There is an individual unit of either the Type *E, F*, or *G* in each room of the research wing, with arrangement and controls to suit the operations. The Type *E* units are installed in rooms with no ceiling, and the casing encloses the motor, drive, mixing valves and appurtenances for appearance. A room thermostat controls a three way chilled water and three way hot water valve for automatic summer-winter control. The Type *F* units are similar except that the heating coil is in the preheat position to prevent freezing and they are operated in conjunction with an automatic damper which provides 100 percent outside air when the fume hoods are in operation, and returns room air with approximately 20 percent outside air when the fume hoods are not exhausting. The Type *G* units are similar except that they are arranged for 100 percent outside air continuously and are used in conjunction with the isotope hood exhaust systems, where electronic velocity controllers maintain a constant velocity through each hood.

Three isotope hood exhaust systems serve the isotope hoods throughout the research wing. Stainless steel ductwork, corrosion resistant fans, throwaway filters, and atomic energy commission type filters are used in these systems. Static pressure controllers are used to provide a constant static pressure at each hood.

Central Units Serve Area Zones

Central units of the Type *A* — vertical floor mounted — or Type *B* — horizontal ceiling suspended — serve single zones such as the kitchen, laundry, lobbies, maintenance shops, and similar areas. Control is accomplished by a zone thermostat modulating a three way chilled water valve and a three way hot water valve for automatic summer-winter changeover. Some of these units have the heating coil in the preheat position to prevent freezing of the water in the cooling coils where 100 percent outside air can be used, as in the kitchen. Some of the units are provided with reheat control to maintain the required space humidity.

Each of the eight operating rooms, as well as the animal operating room, is served by a Type *II* vertical floor mounted unit located in an adjacent equipment room. Each unit has a preheat coil, cooling coil, and reheat coil, and recirculating water spray system with pump.

This type of unit has an insertion type thermostat with the sensitive element on the leaving side of the preheat coil, which controls a three way hot water mixing valve to maintain a preheated winter air temperature of 70 F.

An insertion type submaster thermostat with the sensitive element in the air leaving the spray coil dehumidifier controls a three way chilled water mixing valve for the chilled water coil to maintain dewpoint temperature, and has the control point reset by a room type humidity controller in the conditioned space. A room thermostat modulates a three way hot water mixing valve for the reheat coil to maintain dry bulb temperature in the conditioned space. Each system is supplied with 100 percent outside air and an exhaust fan is interlocked with the conditioner fan to operate at all times that the air conditioner is in operation.

Double Ducts Supply Offices

There are three Type *I*, double duct systems serving principally the administrative offices. Each of these is a blow through system including a cooling coil, and a heating coil in the bypass position above the cooling coil. A hot air duct from the heating coil, and a cold air duct from the cooling coil are run parallel to all areas being served. A static pressure regulator with one sensitive element in each of the supply ducts controls an opposed blade, reverse acting face damper on the inlet side of both coils to maintain a constant static pressure in both supply ducts under varying volumes supplied to each duct. An insertion type submaster thermostat in the hot air supply duct controls a three way mixing valve for the heating coil. The control point of the submaster thermostat is reset from the master thermostat in the outside air duct to vary the hot air supply temperature from 120 F at 20 F outside temperature, to 75 F at 70 F outside temperature. A thermostat in the cold air supply duct controls a three way mixing valve for the chilled water to maintain the desired supply air temperature.

In addition to the above, each space served by these units has a room thermostat which controls hot and cold air mixing dampers behind each supply grille. This provides as near perfect temperature control in every office as possible, with a constant volume of air supply, as each supply source temperature can be varied anywhere between maximum cooling and maximum heating as required.

The entire building comprises approximately 320,000 sq ft and is reported to have cost $8 million. The total cost of the mechanical work, including all piping and all air conditioning systems described, amounted to about $1,790,000.

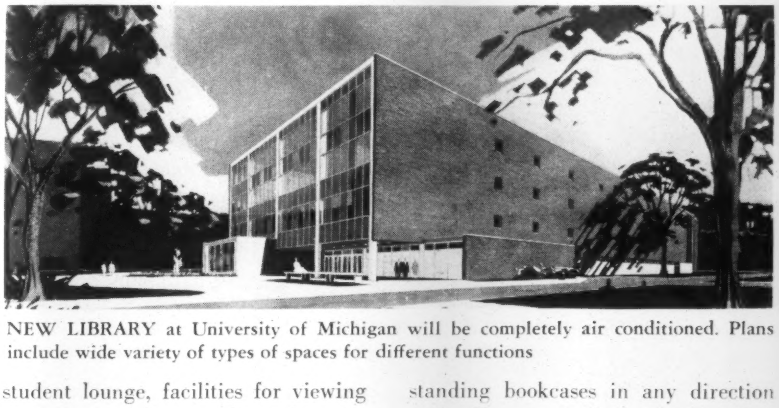
The cost of these systems ran considerably below the estimates prepared in 1950, and it is felt that the great amount of study and planning devoted to the cause of economy paid off in securing a most economical installation without sacrificing performance or efficiency of the system in this hospital.

The architects were Mac Kie & Kamrath in collaboration with Schmidt, Garden & Erikson, Architects and Engineers. ‡

Air Condition New Library At University of Michigan

. . . now under construction

A NEW undergraduate library building for the University of Michigan is now under construction on the main campus at Ann Arbor. Of reinforced concrete construction, the 136,000 sq ft building will be a four story and basement structure, completely air conditioned, according to Albert Kahn Associated Architects and Engineers.



NEW LIBRARY at University of Michigan will be completely air conditioned. Plans include wide variety of types of spaces for different functions

Plans for the library include, in part, such facilities as individual group study rooms, typing rooms, rooms for the blind, multipurpose rooms, exhibit space, audio facilities, student lounge, facilities for viewing documentary films, and spacious informal reading areas.

The module of the building will permit easy rearrangement of free standing bookcases in any direction and will accommodate varied seating arrangements without major change.

Completion of the $2,400,000 structure is scheduled in 1957. ‡

Low Velocity Serve

. . . maintain uniform temperatures, provide frequent large volume air changes, and prevent uncomfortable drafts in biological and chemical research labs, experimental animal room, and manufacturing areas

LABORATORY SECTION is provided 15 air changes per hr via recessed low velocity air diffuser to maintain a temperature of 72, ±2 F

AIR MOVEMENT and temperature control, two vital air conditioning problems in the pharmaceutical laboratories of G. D. Searle & Co., Skokie, Ill., have been solved with the use of low velocity air diffusers.

Experiments involving the use of benzene, ether, chlorine, ammonia, and other substances which produce explosive or toxic gases are common in these laboratories. The fumes are removed easily enough with fume hoods, under which the experiments are conducted. Small, high velocity fans mounted on the roof, with a capacity of 1000 cfm, serving two hoods, draw off the fumes and discharge them above the 44,100 sq ft building roof.

An average of 60 percent of the hoods are in operation at all times. Total air loss under this condition amounts to 15,000 cfm, and when all the hoods are in operation, the air loss amounts to 25,000 cfm. This, added to the normal recirculation volume, represents a large air movement, capable of causing uncomfortable and in some areas detrimental drafts.

Provide 15 Air Changes Per Hr

To solve this problem, low velocity, high capacity air diffusers were selected to provide the required 15 air changes per hr, while keeping air movement to a minimum of 40 to 50 fpm.

Air moving from the duct passes through a circular orifice valve and then is "washed" over a panel containing thousands of tiny holes. Air which has been traveling as high as 1500 fpm is slowed to 40 to 50 fpm by the time it leaves the diffuser.

Because of the large area of the panel — 18 sq ft — as much air is delivered as if it were simply blown into the area. Each room in the lab requires about 750 cfm and is served by two low velocity diffusing units, each 3 by 6 ft and flush with the ceilings.

Hallway Serves As Return Duct

The hallway of the building serves as a return air duct. Because the number of fume hoods in use varies about the 60 percent average, it is necessary to vary the air intake in keeping with their use. This is accomplished automatically through the use of five static pressure controllers in each return duct corridor. The controllers modulate air intake louvers, varying the opening to keep the pressure in the building equalized with outside pressure at all times.

Air Diffusers Pharmaceutical Labs, Plant

The air intake tower, in the center of the building, rises to a height of 10 ft over the roof of the building to avoid contamination from fume hoods. The tower has zoned louvers which are controlled by the corridor static pressure controllers.

350 Ton Unit Chills Water

Serving the air conditioning needs of the research laboratory is a 350 ton refrigeration unit which chills water circulated through pipes to fan rooms throughout the building.

After the refrigerant in the chiller system has done its job, its heat is removed by water which has been cooled by a forced-air cooling tower located on the roof of the building. The refrigerant is cooled in the condenser to about 70 F. After it is used to chill the water for the air conditioning system it begins the cycle again.

Heating system distribution units consist of recessed wall convectors.

A similar problem was solved in the experimental animal room, containing 5000 animals and measuring 100 by 45 by 11 ft high. The desired temperature in this room is 72 F, ± 2 F. In addition, frequent air changes are necessary to offset strong odors.

Using 50 large perforated panels, the temperature is maintained at 72, ± 1 F. The air is changed every 10 minutes, using 30 percent outdoor air makeup.

In the experimental operating rooms, where drafts could be detrimental to an experiment on a specimen, air movement from the low velocity diffusers is imperceptible.

In the library storage room, bookshelf partitions bisect the large perforated panels several times. However, air distribution from the panels is not hampered, and there are no undesirable air diffusion effects.

In other areas of the plant, which covers 25 acres, different problems had to be solved, such as in tablet manufacturing, but the basic method of air distribution is the same.

System Balancing

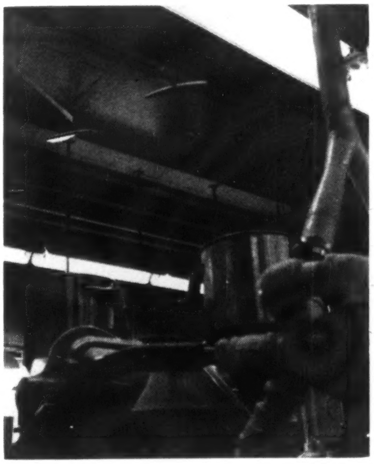
Adjustable dampers can be set for delivery of various amounts of air without disturbing system balance.

Also, the desired air flow pattern is not adversely affected by either single panel adjustments — to suit room occupants' special requirements — or by substantial reduction or increase of air capacity at the source to meet seasonal demands.

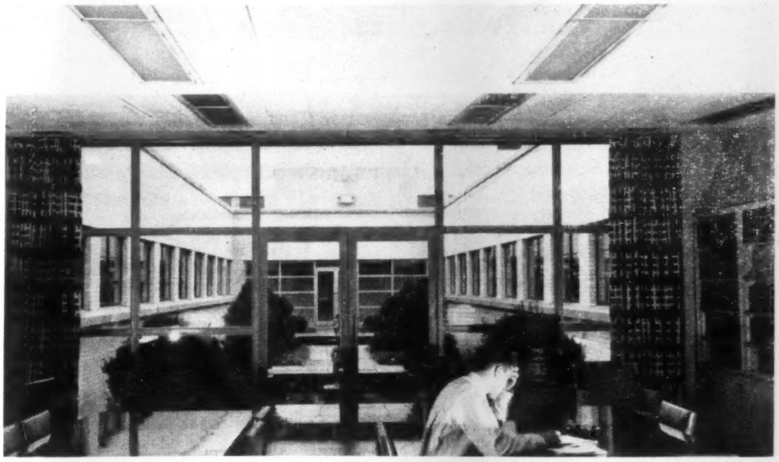
In addition, diffusing air vertically at low velocity eliminates dirt on walls and ceiling. Maintenance men wipe the panels occasionally.

The biggest advantages, the company finds, are the uniform temperature control and the absence of uncomfortable drafts.

The architect for the building was Herbert Banse, and the consulting mechanical engineer was E. P. Heckel and Associates. ╪



PROCESSING AREA of plant, served by low velocity air diffusers, requires a complete air change every 10 minutes



Photos courtesy of MultiVent Div. of the Pyle-National Co.

LIBRARY is served by low velocity air diffuser between the two lighting fixtures. Panel is recessed to keep from marring room's appearance

LETTER FROM LONDON

BY LESTER S. RIES
Formerly Superintendent
Buildings and Grounds
Oberlin College

Penny - in - the - Slot Heaters Set British Public Boiling

. . . over experiment to electrically heat railway station waiting rooms in coal starved economy

An English friend with a wide experience in the heating industry in the British Isles remarked with conviction, "An Englishman will not pay for comfort in his home or office." This statement recalled the observation of an American who has spent several years in graduate studies at the University of London School of Economics, "An Englishman will continue to endure any discomfort as long as it has a long tradition behind it."

During the past several years, Britain has ceased exporting coal and has, in fact, found it necessary to import substantial tonnages of the fuel. It became necessary to conserve coal as one measure to assist the government in its effort to reduce imports and improve the national trade balance. When the coal shortage became acute, the National Transport Commission requested the Regional Railway Managements to do their utmost to reduce fuel consumption. This request precipitated a general order for fuel saving in all divisions of the National Railways and prompted reduction of space heating in all Railway stations.

Coal Fires Cheered Commuters

Customarily, station waiting rooms of the British Railways are heated by means of coal or coke fire stoves. The stationmaster has the sole responsibility of determining the time of the year when these rooms are to be heated, the temperature, and the periods of the day when it is advisable to heat them. Whether this arrangement existed before nationalization or developed since the railroads were nationalized is difficult to determine.

Heaviest travel from the London suburbs occurs at 8 to 9:30 mornings, with the return peak from 4 to 6 in the evening. Commuters enjoyed the psychological reaction of a cheerfully glowing coal burning stove. When as a result of the general order the waiting rooms were generally unheated and cold, the public reacted at once. Increasing expressions of dissatisfaction were received.

Because of this combination of circumstances the management of the Eastern Region of the British Railways decided to experiment. A 2 kw. two bar parabolic reflector electric heater was installed in the waiting room of each of two London suburbs in February 1955. One was installed at the Shenfield & Hutton station, which is on the line running east out of Liverpool station, and one at the New Barnet station running out of King's Cross station. Each heater was equipped with a coin attachment. By inserting one penny in the slot a patron would have warmth and a cheerful glow while he was waiting for his train. At first this period was 20 minutes, but this was found by the management to be too extravagant, and the heating period was reduced to 7½ minutes.

When first installed the heaters had considerable use. It was discovered that even the casual traveler on the offpeak periods found the new heaters convenient. However, the slot mechanism on the original installation was frequently damaged and too susceptible to tampering. A more rugged device was installed which proved to be hardier but still subject to malicious tampering. In the coin box collections a great variety

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Since retiring from active administration at Oberlin, the author has been a consultant to the college. He recently visited Great Britain to study several college and university heating systems and to observe postwar government and private heating progress there. Two previous Letters from London were published in the July and August 1956 HPAC's.

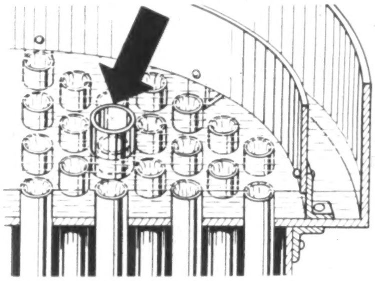
of slugs and numerous foreign coins were found.

Protest Charge for Heating

The public relations office of the Railways received an increasing number of patron letters protesting generally that there was something inherently wrong when a charge was made for heating public space. A London newspaper took up the charge and devoted several issues headlining the unfairness of making revenue out of customers' discomfort. They insisted that heated waiting rooms should be a part of the Railways' service that was implied with the purchase of a ticket. Other newspapers gave the issue similiar publicity, stating that it was wrong to make a profit out of the project. The Railways management countered by stating that there was certainly no profit in the venture and that, considering the servicing required and the wear and tear on the equipment, the charge was only a token payment.

The conclusion seems to be that the pay-as-you-go penny-in-the-slot heater is not an outstanding success. The Railways' general manager continued the experiment through the 1955-1956 winter, but no information was available about the present season. Neither are figures regarding the profit and loss outcome. That there is a need for warmed waiting rooms is generally agreed. ‡

ON THE JOB



Short Pipe Over Tube Speeds Cleaning Job

. . . exchanger stays on line

HERE'S a tip from Thomas C. Wilson, Inc., on cleaning the tubes of open shell type water cooled heat exchangers with maximum speed and efficiency and without taking the heat exchanger off the line.

First, cut a piece of pipe so it is several inches longer than the tube projecting above the tube sheet. The pipe should be large enough to let a hand enter. Then place the pipe over the tube. The tube forms a cofferdam that keeps most of the water from flowing down the tube.

The absence of water in the tube reduces the back pressure on the tube cleaner motor and permits greater power to be delivered to the cutter head, brush, or other accessory. The result will be higher operating speeds. In addition, the absence of a large volume of water will eliminate the cushioning effect on cutters and the large frictional drag encountered in underwater tube cleaning operations. Also, water will no longer splash in the operator's face. ‡

Install Ramp Snow Melter At Indianapolis Airport

. . . serves elevated highway

NEW SNOW MELTING SYSTEM serves outdoor auto ramp at new Weir Cook terminal at Indianapolis municipal airport

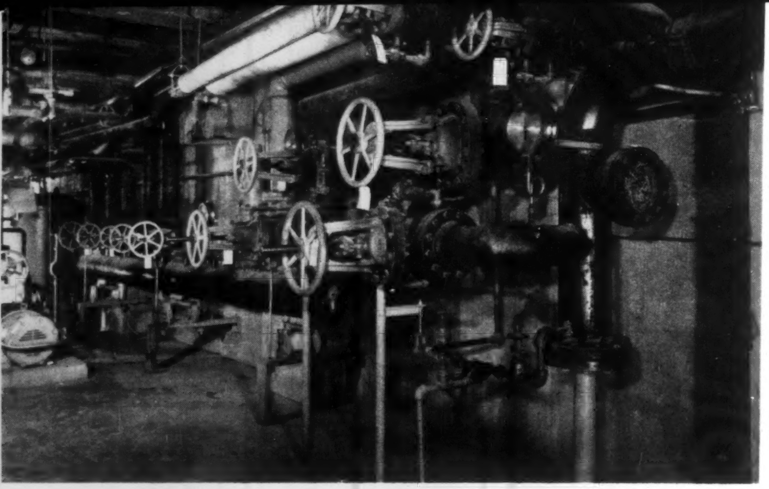
MORE THAN 25 tons of wrought iron pipe are fabricated into rampwide grids installed in the snow melter at the new terminal at Indianapolis municipal airport, according to the A. M. Byers Co.

Oil fired boilers in the terminal structure are the source of heat. Through an exchanger, heat transfer oil is heated and pumped through piping in tunnels to the grids.

Considerable pumping capacity is needed to move the lightweight oil up and down slopes: a 7½ hp pump rated at 275 gpm, and three 5 hp pumps, respectively rated at 200, 247, 294 gpm.

Catch basins at intervals across the ramps, and at each base, trap any excess slush or water.

The consulting engineer was G. M. Williams. ‡



Although each plant has individual requirements of piping, there are several fundamental ways to get more efficiency out of any piping system. In addition to those discussed here, seven others have been presented in previous articles.

BY ROBERT J. PINSKE

How to Increase Efficiency Of Plant Piping Systems

- Piping system should not be overloaded or underloaded
- Operating conditions should be closely controlled
- Adequate safety conditions should be maintained
- Piping system should be thoroughly surveyed, modified
- Piping equipment should be correctly chosen, installed
- Regular maintenance checks and correction should be made

8. Keep Accurate Records for Piping Maintenance

ACTUALLY, few industrial plants have dependable records of their piping equipment and maintenance, the survey showed. Accurate records are necessary if management wants to reduce the cost of piping maintenance to a minimum and still operate economically and efficiently. Obviously, records are the basis for establishing future policies. But if they are not dependable, the records will only lead to a policy based upon inefficient, uneconomic, false ideas.

Paper work is a burden to all maintenance departments, and this is especially true of the pipe fitting department. The components of a piping system, with the exception of automatic control valves and pressure switches, are usually hand operated. They are therefore thought of as stationary objects and subject to little or no wear. Even the mechanism of a steam trap is enclosed in a housing that does not reveal whether or not it is moving.

As a result of this misunderstanding of a piping system, often the only records kept are the number of pipe fitters employed. These records are then used to compare the number of pipe fitters to the total production workers. Management will use this comparison to determine the number of pipe fitters they should employ or lay off, the main idea being to keep a certain ratio of pipe fitters to production workers. This policy is usually followed regardless of the condition of the piping system, the number of leaks, or the cost of the leaks. Adequate records are the only solution to economical piping maintenance.

There are two types of records recommended for use in piping maintenance. The Kardex record system which incorporates both a preventive maintenance schedule and maintenance cost summary is one type. The other type of record system uses punched accounting cards and automatic business machines.

Permits Efficient Scheduling

The Kardex record employs visual signals to determine the next inspection date for every piece of equipment and the type of inspection required. This manual type of record permits efficient scheduling of work to be done and, thus helps to stabilize the work load. The pipe fitters time can be planned for maximum efficiency. Adoption of this type of record can eliminate the guesswork on the proper interval between inspections. Decisions can then

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The author is sales manager, heating and industrial division, Warren Barr Supply Co. Previously he was a power plant engineer with Crane Co.

Previous articles by Mr. Pinske on industrial piping maintenance have been published in the November and December 1956 and January 1957 HPAC's.

be made on the basis of actual experience for each type of equipment. The Kardex record can also be used for the proper control of inventory.

The other type of record, processed in automatic business machines, is the accounting card with punched holes. On the punch cards, any size, group, or series of numbers can be used for coding information. For example, the following numbers might be used to indicate this sample breakdown: 1. 2. 3. 45. 6. 7. No. 1 is the pipe fitting department; 2 is the department or section maintained; 3 is the pipe fitter's crew number; 45 is the type and number of the piping equipment; 6 is new piping construction, and 7 is maintenance piping.

In this case assume a trap is the piece of equipment. With this method, it would be possible to accurately know the reason why this trap was operating with high maintenance costs. Under the card system it is possible to tabulate by type of work done and by the department requisitioning work. Work done by different crews can also be tabulated. Every operation or element involved is thereby broken down for appraisal.

Records Save Three Ways

This will enable management to realize savings in three basic ways:

1) It is hard to tell a foreman that he has too many men on the job, but when it can be pointed out that a certain simple job is averaging 20 man-hours, he investigates to find the cause. In this way it is possible to work backwards from man-hours to do a certain job to an overall figure of men and hours involved including indirect labor costs.

2) A large amount of work decided upon without adequate thought is automatically and self-consciously eliminated when accurate cost probabilities are presented.

3) Material costs as well as labor are controlled. The system indicates where the excessive costs are and when they occur. In the same way, piping equipment maintenance costs are reduced and improperly handled equipment is reflected in unusual maintenance time or repair material costs. Any item out of proportion is immediately stopped. Explanations can be required.

The mistaken or wrong action may not be seen, but with adequate records the resulting cost is outstanding on a weekly or monthly report. The study of these records will usually show where a decrease in personnel is possible with an increase in the number of jobs handled. The information needed to control costs, judge performance, and plan efficiently can be provided only with the proper records.

9. Must Overcome Indifference to Piping Maintenance

MOST INDUSTRIAL PLANTS had to operate under military directives during World War II. Often, production for profit was sacrificed to the important job of producing the goods, regardless of cost. Among the chief victims of these military directives have been the piping systems of these plants.

Early in the war the skilled pipe fitters were moved from piping maintenance to more urgent fabricating jobs. During this same period, shortages in materials meant that extensions and replacements had to be made with substitute metals and with available types of valves and fittings. As a result, piping had to absorb the strain of years of multiple shift operation without adequate care, and at the same time, accommodate itself to a sudden changeover in product design without an adequate changeover in its own design.

The great bulk of this piping is still in operation at the present time, and industry is demanding from this same piping a greater capacity than it was originally designed for. At the present time, the piping in most plants is more worn out than any other type of equipment.

Since piping is a major conveyor of both the power and materials essential to the act of fabrication, it directly influences three of the factors which help determine costs and establish profits. These are production schedules, spoilage rates, and product quality. Hence, a sound and economical plan for the rehabilitation of piping equipment, by initiating an adequate schedule of efficient piping maintenance, is essential.

Obviously, this is a difficult task. No plan can be developed until a complete survey of all the plant piping systems is made in detail of every operating division. The primary steps in arriving at a sound decision, covering the rehabilitation of a plant piping system, lie in establishing two sets of ordinates: one fixed by a realistic summary of their physical condition; the other, by the objective: maximum plant efficiency.

This objective includes three major factors:

Size of Piping System. Always an important factor, the piping system should be of adequate size and be designed for maximum efficiency. This is especially important at the present time because most industrial plants have expanded to the point where there has been a decided change in their power loads.

Unless that change is reflected in the plant piping layout, waste cannot be avoided. But with inadequate records of piping maintenance — both labor and material — management is not in the position to know its efficiency and the cost of the waste taking place.

Every industrial plant has different requirements of piping. Therefore, the actual requirements of the individual plant are the only practical measure of the type of piping system needed and the equipment that must be specified. Any deviation from this fundamental will be reflected in overloading or underloading of the piping, and both will only result in excessive costs.

Proper Operation of Piping System. Obviously, the operation of any piping system is essential to the overall operating efficiency of any industrial plant. The survey brought to light the great amount of inefficiency in a large percentage of the plants visited. A carefully selected number of industrial plants revealed some very significant results as to how maintenance executives appeared to overlook the management of their plants. In 37 percent of the industrial plants inspected the reduced production could be directly traced to worn out equipment, or leaks of steam, air, or water in the piping systems. In 26 percent of the industrial plants, piping troubles which could have been eliminated with very small investment were resulting in excessive product spoilage due to uneven heat application, dilution, and contamination.

Adequate Safety Conditions. Always important are the hazards that may result in serious accidents to personnel, the widespread damage to plant equipment, and the unnecessary delays and repairs to the plant operation. The survey revealed that 20 percent of the industrial plants had suffered a major damage resulting from piping failures, such as pipe ruptures, valve fractures, and in some instances the cost could be calculated in human life as well as in a costly shutdown of the plant.

This same condition has been present in a large percentage of industrial plants built prior to 1941, and it is not hard to imagine that the risks have been considerably increased during the past decade of operation because management has deferred piping maintenance and replacement of piping equipment too long. The situation in some of the plants visited was actually extremely grave, and the maintenance executives did not realize how inefficient their piping system was.

10. How to Survey a Plant Piping System

FOR an accurate picture of present conditions and needs, a survey should be made. The survey must be thorough. In this way, the plant piping system can be brought up to its peak operating efficiency, often with reduced operating expenditures.

Many Systems Require Changes

Some piping changes, of course, have been made in the past decade of operation, and many of them now require modification to compensate for changes in plant operating conditions. These modifications, in many cases, will result in greatly increased plant piping efficiency. It has frequently been found that piping installations of recent years that provided the high load capacity required may now be too large or too small for the job and, as a result, may now be a source of waste.

For example, too large piping in steam lines means excessive condensation, improper heat at the required point of application, and a waste of fuel. To lift such burdens from operating budgets, compensating moves must be made in piping wherever substantially increased or decreased plant load requirements are now in effect. Where the load on piping systems has been increased or decreased, there is usually an unbalance in the lines from end to end. Some lines, for example, will be found too small for efficient operation of production machinery, thus highly taxing production costs.

In many cases during the past few years, and during the period of World War II, emergency extensions of piping systems were necessary. Therefore, the performance of the piping system as it is now operating with respect to present day load requirements must be investigated.

Too often, emergency installations prove wasteful because, frequently, pressures introduce conditions of incorrectly used materials, improper sizes, and unnecessary amounts of piping. The author has observed many piping installations that were made because of emergency conditions. They were made in haste and have been in operation for years, even though the operating efficiency has been considerably decreased and excessive waste has taken place.

In cases like this, lacking sufficiently accurate records, management does not know the real cost, and hence is reluctant to invest in any piping modifications.

Where changing manufacturing programs demand operation under increased load conditions with elevated pressures and temperatures, piping systems must be analyzed completely for expansion, vibration, and weight strains. Such strains throw the entire system out of balance; unless compensated for, sooner or later they take a high toll in crippled valves, fittings, and other equipment not suited for the changed operating conditions.

Sectionalize Piping

For convenience and for minimizing interruptions of service and for general economy in piping maintenance, valves must be installed to permit the individual sections of piping to be turned in or out whenever necessary. Likewise, unions or flanged connections should be provided to permit easy removal of a section without causing a prolonged shutdown. With the rising cost of labor, management may want to reduce the amount of overtime.

Therefore, a complete and thorough inspection of all plant piping must be made to reveal the locations at which valves are needed to permit individual control of each section of the piping system. Unions and flanges should be installed at all points where it is necessary at some time to remove sections of piping or to disconnect apparatus. The cost of the material and labor will amortize itself quickly with the savings in expenditures required for labor paid at premium pay rates. ⌖

Other articles by the author on piping maintenance will be published in future issues of HPAC.

The Law and Your Profits

BY WILLIAM HURD HILLYER

Was HPAC Contractor "Ousted"?

. . . when he allowed the general contractor to pay for labor and materials to complete a heating and air conditioning installation and ended up in the red. No, says court, since he still exercised some measure of control over time, manner, and method.

THIS MONTH'S CASE shows what happened to a heating, piping, and air conditioning contractor that accepted aid from the general contractor rather than be "ousted" from the job.

The Goodbird Corp., general contractor for building St. Samuel's hospital, subcontracted a considerable part of the work to a score of subcontractors. Among these were Cal-Met, Inc., who installed the heating and air conditioning ducts, and Lackpenny Bros., who had the subcontract to insulate the ducts for $26,500.

The third month one of Lackpenny's suppliers notified Goodbird that Lackpenny owed a past due account of $4700 on the job.

Lackpenny was doing several other jobs at the time. He defaulted on his payroll. He went to Goodbird Corp.'s headquarters in another city, where he told its secretary and treasurer that the insulation subcontract would cover the cost and leave a good profit. The treasurer accordingly paid off Lackpenny's employees on the hospital subcontract and also the supplier in full.

Thereafter, until the completion of the work a year later, the Goodbird concern paid with its own checks all the wages of men employed by Lackpenny on St. Samuel's hospital, charging the advances to his subcontract. Goodbird instructed its general superintendent to watch Lackpenny Bros. very closely.

When litigation arose, it was testified that if Goodbird had not paid for "a great deal of the materials" and for the labor to complete the insulation of the ductwork, the subcontract "would never have been completed" by Lackpenny.

As a result of Goodbird's efforts, the Lackpenny subcontract wound up in the red; but there was 3205 sq ft of insulation left over. This the general contractor sold to Cal-Met, Inc., and credited Lackpenny's account with the proceeds.

Meanwhile, Lackpenny had made further purchases on the hospital job from a firm which did not know he was in financial straits, hence did not require Goodbird's guaranty. It was nearly a year before this firm, May-Terial Co., notified the general contractor of its claim. No payment forthcoming, May-Terial sued Goodbird Corp. and Lackpenny Bros. for the past due account.

May-Terial alleged that Goodbird had "ousted" Lackpenny from the hospital job and completed the subcontract in such a way that they had no margin of profit. Therefore, May-Terial could not collect its account through trade channels.

In municipal court the supplier won a judgment, and the general contractor appealed. The higher tribunal saw no evidence "that the defendant contractor ousted the subcontractor and completed the subcontract, or that it directed the time, manner, and method of the subcontractor's operation so as to render it liable for the material sold to him. Therefore, the court of appeals reversed the lower court's decision and remanded the case for a new trial.

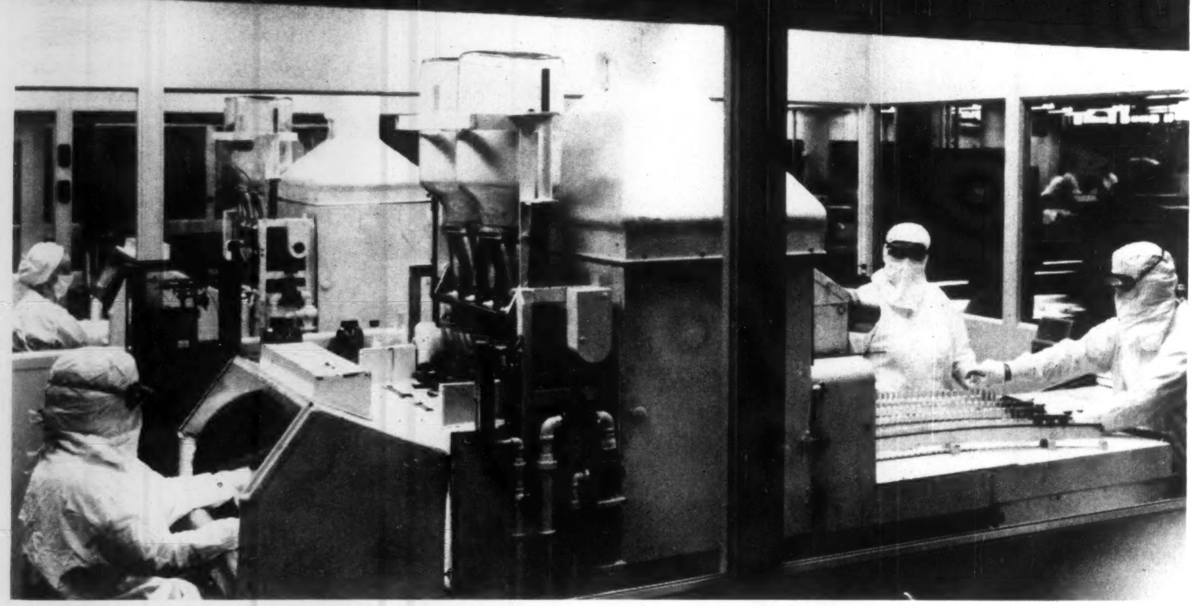
This narrative hinges upon a simple question: what, under law, constitutes "ouster" of a subcontractor by a general contractor? Plaintiff in this case contended that before the insulating subcontractor completed his job, the general contractor "took possession of the materials which had been delivered to the job site" by plaintiff and others, and physically took over the subcontract and "ousted" Lackpenny from the job; that the general contractor thereafter completed the subcontract "and in so doing adopted the subcontract as its own;" and that the general contractor received the benefits thereof and "is liable for all the obligations" arising thereunder.

The appeals court thought otherwise because the evidence did not show that Goodbird "directed the time, manner, and method" of Lackpenny's operation. As to taking over the subcontract's execution, the evidence revealed nothing more than the general contractor's keeping a close watch over the work being done. "This it had a right to do," declared the court.

As this case demonstrates, once a subcontractor accepts financial aid from the general contractor, he may find himself facing a deficit on the job, incurred largely beyond his control, yet be unable to pin the responsibility on the general contractor or anyone else. ǂ

WILLIAM HURD HILLYER, *author of this regular feature, is a contributor to a number of banking and financial publications and has written several books on business. He has an extensive practical legal and financial background.*

This series presents actual cases. Naturally, laws vary in different states. All names are fictitious.



STERILE PRODUCT FILLING at Abbott Laboratories is carried on in a special air conditioned atmosphere held to exact temperature, moisture content, and sterility requirements dictated by the product

Punch Cards Keep Air Conditioning Maintenance Under Tight Control

• Big pharmaceutical manufacturer guards against downtime by anticipating needs of equipment before repairs become necessary. Simple punch card system keeps detail control on maintenance work done and work scheduled.

BY A. E. BOHLAND
Project Engineer
Surface Combustion Corp.

Maintenance of air conditioning equipment, a critical factor in pharmaceuticals, has been developed at Abbott Laboratories to a point where advance thinking and planning are cutting downtime substantially. Company engineers regard the practical results of the developing maintenance program as "dramatic," even though the program is far from completion.

A fair estimate is that the procedure has cut maintenance labor hours on most air conditioning equipment about 25 percent. Many problems formerly accepted as routine have disappeared.

Downtime has been cut to the minimum, usually to the actual time scheduled for inspections.

These advances permit channeling more engineering effort and labor among the 3000 employees directly into production and research.

Why Efficiency Is Important

This firm, one of the largest ethical drug houses in the world, lays particular stress on the efficiency of the air conditioning systems in its North Chicago plant because exact control of the condition of the air — its temperature, its moisture content, its sterility — is essential in compounding its products.

Also, air conditioning means better working conditions for the employees.

Air conditioning at Abbott is, of course, a part of the 68 year old firm's constant search for better methods and better equipment. A number of systems have been installed to maintain specific conditions in various parts of the plant.

Air conditioning systems, no matter how well built or installed, are subject to maintenance problems.

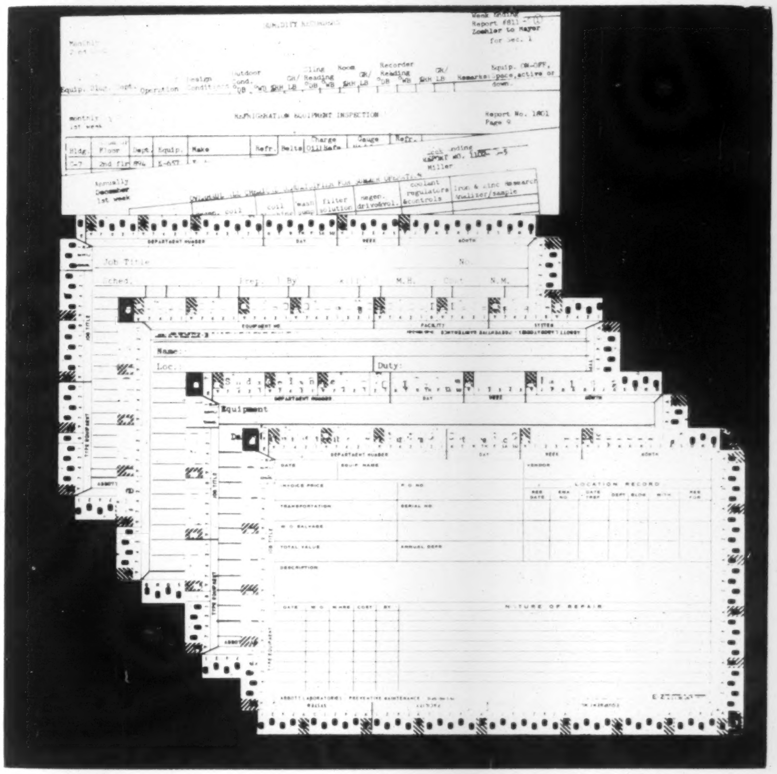
Over a period of years, Abbott attacked these problems and now has developed a general maintenance program intended to anticipate whatever can be anticipated, to mitigate what cannot be anticipated, and to keep everything in the plant always at top operating condition.

In the program, Abbott has distributed responsibilities along the natural flow lines of the plant, with three main areas in chemical manufacturing, antibiotics, and pharmaceuticals. A staff engineer is in charge of maintenance engineering on production equipment in each area, and the manager of area maintenance coordinates their work. The central shop supplies personnel to areas and maintains equipment involved in heating, ventilating, air conditioning, refrigeration, instrumentation, material handling, and plant services.

The whole field of maintenance has been broken into two general categories: preventive and scheduled maintenance. Preventive maintenance calls for inspection — visual in many cases — of components which must be watched most closely. These include lubrication systems, belts, condition of refrigerants, and the lithium chloride solutions used in humidity conditioners. This is done at fairly close intervals, up to monthly.

Scheduled maintenance calls for more detailed checks, including, if necessary, teardown to determine the amount of wear on bearings, the state of valves, packing, and other parts.

The program enables the maintenance engineers to find instantly every wanted fact about each unit: each blower, each fan, each compressor, each humidity conditioner. The facts can be determined easily, either on one part or the whole of each system.



PUNCH CARD DATA, gathered in preventive maintenance checks, is logged by maintenance clerks on these forms which give overall status of equipment and details on condition of individual components

Code Cards By Punch and Color

The program is worked out through a series of simple, yet comprehensive punch cards. In this system, all cards pertaining to the components of a single unit have a common color or punch. Each card for all the components of a complete system are similarly segregated. On a planned program, each set of cards is pulled, to trigger either a preventive or scheduled maintenance inspection. They are also tied into the company's cost accounting system.

All information gathered in these checks, either preventive or scheduled, is logged by the maintenance clerks on forms which give at a glance the overall status of the equipment and at the same time detailed data on the condition of individual components.

For instance, preventive maintenance reports on the solution used in the 15 humidity conditioners show quickly all model information, the location of each unit, the job it is designed to do — in terms of relative humidity and temperatures to be maintained — and the dated readings on the condition of the solution. These include the maximum and actual specific gravity, the pH factor of acidity, and similar data.

Schedule Periodic Checks

Semi-monthly preventive maintenance forms to show the general condition of the humidity conditioners provide space for abbreviated solution information, plus data on the regeneration steam valve and pump pressure. Space is also given for special comments.

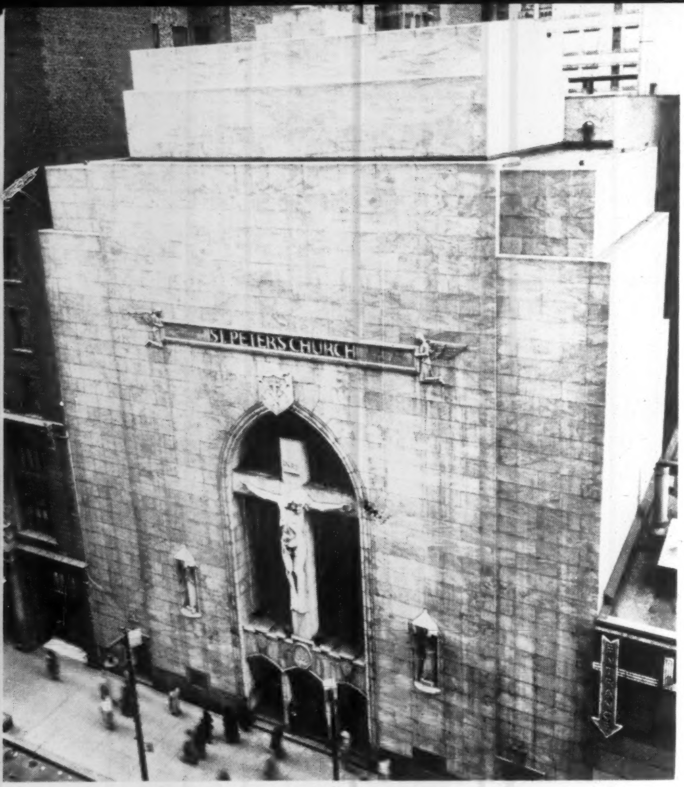
Scheduled annual inspection in December on this equipment calls for checks of the regenerator coil circuits, coil flushing, washing the sump, testing the solution filter, and checking the regenerator drive and volume and coolant regulators and controls.

Additional general checks are made on the regenerator air volume, fan, motor, and drive; the chamber housing, the sump and float switch, pump, and motor; the solution filter and air filter; gages and thermometers; and other elements, including painting.

Record Work Done

The work done on each humidity conditioner, air conditioner, refrigeration unit, or other component of the general system is recorded on punch cards, along with the cost in labor and materials. The cards are so keyed that the engineers or cost accountants can quickly pull all information concerning any one unit. Individual report forms are paired with each card for each inspection.

Thus, in condensed form, the whole history of a unit or of a complete system — its maintenance cost, its comparative efficiency, and its "bugs" or idiosyncrasies, if any — can be laid out on a desk in minutes for a quick decision on any problem. ⌗



St. Peter's church in Chicago's Loop is a five story structure of modern design. It is completely air conditioned by a 265 ton capacity direct expansion system

Four Separate Systems Used To Condition New Chicago Church

. . . each complete with compressor, condenser, receiver, and evaporator coils

ONE OF CHICAGO'S newest and most notable houses of worship is in the heart of the downtown area. Standing five stories high, St. Peter's Roman Catholic church at 110 West Madison St. towers impressively, inviting the passing thousands to stop in for a moment of meditation and comfort — comfort provided by warmth in winter and air conditioning in summer.

The entire structure is air conditioned with the exception of the fifth floor, which is as yet unassigned. Once the assignment is made, this floor too can be cooled from the existing capacity.

The other four floors are divided into various chapels, living quarters, and offices. All are comfort cooled according to the design conditions for this area, namely, 95 F dry bulb and 75 F wet bulb temperatures outdoors, with not higher than 80 F DB and 67 F WB indoors. For the living rooms the air unit provided is for year 'round use, as it is a means of ventilation during the periods when no cooling is required.

The cooling system consists of four direct expansion condensing units having a total capacity of 265 tons, designed to operate at 45 to 50 F suction temperature and 90 F condensing temperature, using shell and tube condensers.

All air to be conditioned passes through two banks of oil filters and a mat type filter.

Here is a space breakdown of each floor and a description of the equipment designed to serve it. To avoid confusion, each air unit is given a number designation, and each condensing unit includes the compressor, motor, shell and tube condenser, operating controls, and accessories. The capacity in tons of the condensing units is the rating at the conditions under which the equipment must operate.

The basement contains a small chapel or assembly room, with a total seating capacity of 500 people. In addition, there are several small rooms in the basement. The basement chapel is served by air unit No. 1 located in the subbasement. The unit circulates 6600 cfm of all outside air and has an eight row cooling coil and two row heating coil, with a total face area of 11.5 sq ft. The heating load is 2630 EDR, with 657 lb of steam per hr. The cooling load is 30 tons. Serving this air unit is condensing unit A, with a capacity of 66 tons and driven by a 50 hp motor. Air unit No. 2 serves the several small rooms.

The first floor and first mezzanine contain the main chapel, and pastor's suite, 12 private offices, and two private chapels. The seating capacity of the main chapel is about 1500. The second mezzanine contains two chapels, each having a seating capacity of about 250 people.

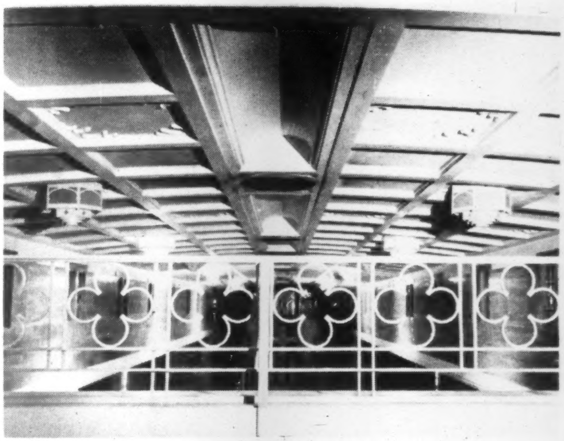
Air unit No. 2, in the subbasement, serves the first and second mezzanine, the several small rooms in the basement, the subbasement, and any other miscellaneous space. Unit No. 2 circulates 14,500 cfm of all outside air. It has an eight row cooling coil and two row heating coil, with a face area of 32 sq ft. The heating load is 5131 EDR with 1283 lb of steam per hr. The cooling load is 54 tons. Serving air unit No. 2 is condensing unit B, which is also in the subbasement. Condensing unit B has a capacity of 66 tons and is driven by a 50 hp motor.

Serving the first floor main chapel is air unit No. 3, which is on the fifth floor, 95 ft above the subbasement. Unit No. 3 circulates 15,600 cfm of all outdoor air and has a 10 row cooling coil and a two row heating coil, with a face area of 35 sq ft. The heating load is 7084 EDR with 1772 lb of steam per hr. The cooling load is 68 tons. Serving air unit No. 3 is condensing unit C in the subbasement. Condensing unit C has a capacity of 77 tons and is driven by a 75 hp motor.

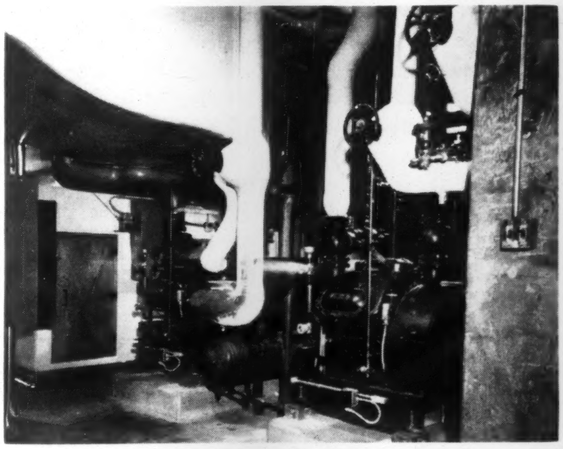
The second floor has two chapels, both of which are served by air unit No. 4 in the subbasement. This circulates 3700 cfm of all outdoor air and 4400 cfm of recirculated air for a total of 8100 cfm. It has an eight row cooling coil and a two row heating coil, with a face area, of 18 sq ft. The heating load is 1350 EDR with 338 lb of steam per hr. The cooling load is 30 tons. Serving air unit No. 4 is condensing unit A, which was described earlier.

The third floor has the priests' living quarters, consisting of 16 bedrooms, a recreation room, library, a dining room, and a kitchen. The fourth floor contains living quarters for the brothers and consists of 32 bedrooms, plus a library and recreation room.

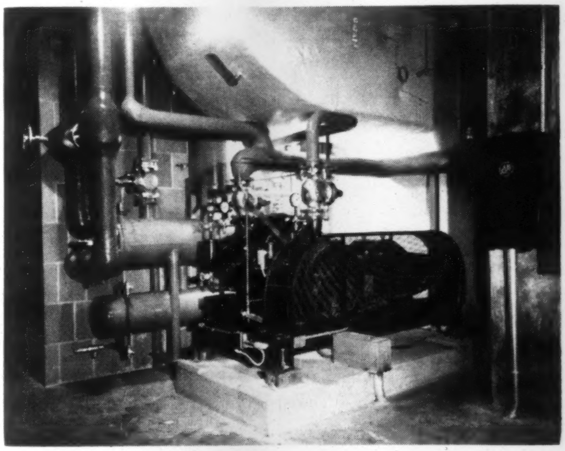
Serving the third and fourth floors is air unit No. 5, which is located in the penthouse, 110 ft above the subbasement. Unit No. 5 circulates 5180 cfm of outdoor air and 4620 cfm of recirculated air, or a total of 9800 cfm. It has a 10 row cooling coil and a two row heating coil, with a face area of 22 sq ft. The heating load is 2531



CENTRAL STATION air conditioning system assures desired temperatures and humidity conditions by means of air distributed from ceiling diffusers in one of the four chapels shown



COMPRESSOR on the left has a capacity of 75 tons and is driven by a 75 hp motor. The unit on the right has a capacity of 65 tons and is driven by a 50 hp motor



COMPRESSOR AND CONDENSING UNIT shown here has a capacity of 40 tons plus a reserve of 20 tons for the fifth floor when that is finished and added to the load

CONDITIONED AIR is distributed through ceiling panel diffusers into 60 individually controlled rooms on the fourth floor

EDR with 633 lb of steam per hr. The cooling load is 35 tons. Serving air unit No. 5 is condensing unit D, which is in the subbasement. Condensing unit D has a capacity of 40 tons, plus a reserve of 20 tons for the fifth floor, if and when it should be furnished. The unit is driven with 50 hp motor.

All the foregoing condensing units are provided with automatic capacity modulation to maintain the proper balance of compressor capacity and air unit loads under variable conditions.

In figuring the load for this installation, several special problems were encountered. First, it was desired to make the installation a direct expansion system using fluorinated hydrocarbon refrigerant No. 12, but the city code limited the amount of refrigerant in an individual system. So four separate systems were used, each complete with compressor, condenser, receiver, and evaporator coils.

When figuring the load, every effort was made to divide up the conditioned space so that each of the four systems would serve, as nearly as possible, space that was in use about the same time and about the same number of hours.

There was, of course, the problem of extreme load variation, since the chapels have a light occupancy load at certain hours and a maximum load at others.

There were a few unusual features in the installation of this equipment. As mentioned earlier, owing to lack of space in the subbasement, air unit No. 3 was installed on the fifth floor, and air unit No. 5 was installed in the penthouse. As a result, the two condensing units operating on these high level air units required a liberally sized liquid refrigerant subcooler.

Also, it is quite unusual to find a job of this size using direct expansion.

This installation has proved to be trouble free and has been a constant source of satisfaction not only to the priests, brothers, and parishioners of St. Peter's, but to many thousands of the passing parade as well. During the summer of 1955, a record breaker for days of 90 F or over, there were crowds going in and out of the church all day long. ‡

Gas Industry 1956 Peak Breaks All Records

. . . 1957 to be greater

THE GAS utility and pipe line industry, continuing its dynamic growth pattern of recent years, climbed to record breaking peaks in 1956 and looks ahead to 1957 as a year of even greater achievement in all phases of operation, according to Clare H. Zachry, president of the American Gas Association.

Record expenditures of $1.65 billion during 1956 for new facilities to serve more customers reflected the progress of the industry, which now has assets of about $17½ billion, with the prospect of reaching $24 billion by 1960, for almost a quadruple gain in a decade and a half.

A major gas industry development in 1956 was the completion of the $230 million "Scenic Inch" pipe line from the Southwest to the border of Canada to bring natural gas to the Pacific Northwest for the first time.

Approximately 20,000 miles of gas mains were constructed in 1956 to bring the total mileage to 517,000.

Underground storage operations have also been increased substantially. At the start of 1956, there were 178 underground storage pools in 19 states. The 6746 active storage wells in these pools had an ultimate capacity of 2.1 trillion cu ft.

An additional 10 pools under construction at the start of 1956 were estimated at a capacity of 81.7 billion cu ft. Underground storage is becoming increasingly important in stabilizing the gas load.

The gas industry spent $61 million on construction of underground storage facilities in 1956 and will spend $15 million on them in 1957.

Proved recoverable reserves of natural gas at the beginning of 1956 were at a record high of 223.7 trillion cu ft, an increase of about 12 trillion cu ft over reserves at the beginning of 1955. These new reserves more than offset the record production of 10.1 trillion cu ft in 1955, up from 9.4 trillion cu ft the previous year.

An average of 30.3 million customers will be served in 1957, with utilization of 76.6 billion therms of gas. By 1960, the prospect is for the sale of 92 billion therms to serve more than 33 million customers.

The industry's record construction expenditures of $1.65 billion during 1956 will be surpassed in 1957 by an estimated 18 percent. About 96 percent of the industry's expenditures during 1957 will be for facilities of natural gas systems. ‡

Flow Chart Speeds Design of High Pressure Gas Piping

. . . saves time and work. Another chart, for low pressure gas, will be published as an HPAC Data Sheet in the near future

BY WILLIAM J. WHATLEY
Mechanical Engineer
Patchen and Zimmerman
Consulting Engineers

THE HIGH PRESSURE gas flow chart on the following page is based on the Weymouth formula for rate of flow in cubic feet of gas per hour:

$$Q = 18.062(T_o/P_o)\,[(P_1^2 - P_2^2)\,d^{5\,1/3}/GTL]^{1/2} \quad \ldots\ldots\ldots\ldots [1]$$

where: Q = Rate of flow, cu ft per hr; T_o = Absolute temperature F, at which the quantity Q is expressed; P_o = Absolute pressure, psia at which quantity Q is expressed; P_1 = Initial absolute pressure, psia; P_2 = Final absolute pressure, psia; d = actual inside diameter of pipe, in.; G = Specific gravity of gas, with air = 1.0; T = Absolute temperature, F, of gas in the pipe; and L = length of pipe, miles.

A chart designed to account for all the factors involved in the above would not be very practical. Therefore, the following values have been used in developing the chart.

Assuming P_o = 14.7 psia; T_o = 60 F, or 520 absolute, and further converting the formula to: L = Length of pipe, ft, G = Specific gravity of gas, 0.60 (Air = 1.0), T = 60 F, or 520 F absolute, and squaring both sides, the formula becomes:

$$P_1^2 - P_2^2 = Q^2L/6{,}900{,}000\ d^{5\,1/3} \quad \ldots\ldots\ldots [2]$$

where: Q = Quantity or rate of flow in cu ft per hr, measured at atmospheric pressure of 14.7 psia and 60 F; at a specific gravity of 0.60, with air = 1.0; L = Length of pipe, ft; d = actual inside diameter of pipe, in.; P_1 = Initial absolute pressure, psia; P_2 = Final absolute pressure, psia.

In applying the gas flow chart, the left hand value of Equation 2, or $P_1^2 - P_2^2$, is read directly in pounds per square inch absolute per 100 ft of pipe for any given pipe size, and any given rate of flow, Q, at the conditions outlined above.

Pipe sizes are nominal inside diameters. Actual inside diameters and corresponding values of $d^{5\,1/3}$, on which the charts were based, are listed below:

Nominal pipe size, in.	Actual inside diameter (d), in.	$d^{5\,1/3}$
½	0.622	0.0795
¾	0.824	0.3563
1	1.049	1.2903
1¼	1.380	5.5706
1½	1.610	12.681
2	2.067	48.018
2½	2.469	124.05
3	3.068	394.90
3½	3,548	860.2
4	4.026	1683.3
5	5.047	5620.0
6	6.065	14,968
8	7.981	64,695
10	10.020	217,756
12	11.938	554,045
14 (OD)	13.126	919,156
16 (OD)	15.000	1,872,619
18 (OD)	16.875	3,501,023
20 (OD)	18.814	6,270,270
24 (OD)	22.626	16,769,430

How to Determine Pipe Diameter

Determine the pipe size required to handle 200,000 cu ft of gas per hr at an initial pressure of 60 psig with a pressure drop of not over 10 psig in a length of 1500 ft. Proceed as follows:

$$P_1 = 60 + 14.7 = 74.7 \quad \ldots\ldots\ldots\ldots [3]$$

$$\text{Pressure drop} = 10 \text{ psig} \quad \ldots\ldots\ldots\ldots [4]$$

$$P_2 = 50 + 14.7 = 64.7 \quad \ldots\ldots\ldots\ldots [5]$$

$$P_1^2 = (74.7)^2 = 5580 \quad \ldots\ldots\ldots\ldots [6]$$

$$P_2^2 = (64.7)^2 = 4186 \quad \ldots\ldots\ldots\ldots [7]$$

$$P_1^2 - P_2^2 = 1394 \quad \ldots\ldots\ldots\ldots [8]$$

Pressure drop per 100 ft is:

$$(1394/1500)\,100 = 92.7 \text{ psia} \quad \ldots\ldots\ldots\ldots [9]$$

The chart indicates — at the intersection of perpendiculars representing values for 92.7 psia and 200,000 cfh — that 6 in. diam pipe is required.

How to Determine Pressure Drop

Determine the pressure drop encountered in handling 200,000 cfh of gas at an initial pressure of 60 psig, through a 5 in. pipe over a length of 1500 ft. Proceed as follows:

$$P_1 = 60 + 14.7 = 74.7 \quad \ldots\ldots\ldots [10]$$

$$P_1^2 = (74.7)^2 = 5580 \quad \ldots\ldots\ldots [11]$$

On the chart, following the value of $P_1^2 - P_2^2$ per 100 ft for 200,000 cfh, through 5 in. diam pipe, shows that the final pressure will be 104 psia.

Then:

$$(1500/100)\,104 = 1560 \quad \ldots\ldots\ldots\ldots [12]$$

$$5580 - 1560 = 4020 = P_2^2 \quad \ldots\ldots\ldots\ldots [13]$$

$$P_2 = 63.3 \text{ psia} \quad \ldots\ldots\ldots\ldots [14]$$

$$63.3 - 14.7 = 48.6 \text{ psig} \quad \ldots\ldots\ldots\ldots [15]$$

Therefore, the pressure drop is:

$$60 - 48.6 = 11.4 \text{ psig} \quad \ldots\ldots\ldots\ldots [16]$$

How to Determine Maximum Rate of Flow

Determine the maximum rate of flow that can be handled by a 5 in. pipe over a length of 1500 ft with an initial pressure of 60 psig and a pressure drop of not over 10 psig. Proceed as follows:

$$P_1 = 60 + 14.7 = 74.7 \quad \ldots\ldots\ldots [17]$$

$$\text{Pressure drop} = 10 \text{ psig} \quad \ldots\ldots\ldots\ldots [18]$$

$$P_2 = 50 + 14.7 = 64.7 \quad \ldots\ldots\ldots [19]$$

$$P_1^2 = (74.7)^2 = 5580 \quad \ldots\ldots\ldots [20]$$

$$P_2^2 = (64.7)^2 = 4186 \quad \ldots\ldots\ldots [21]$$

$$P_1^2 - P_2^2 = 1394 \quad \ldots\ldots\ldots\ldots [22]$$

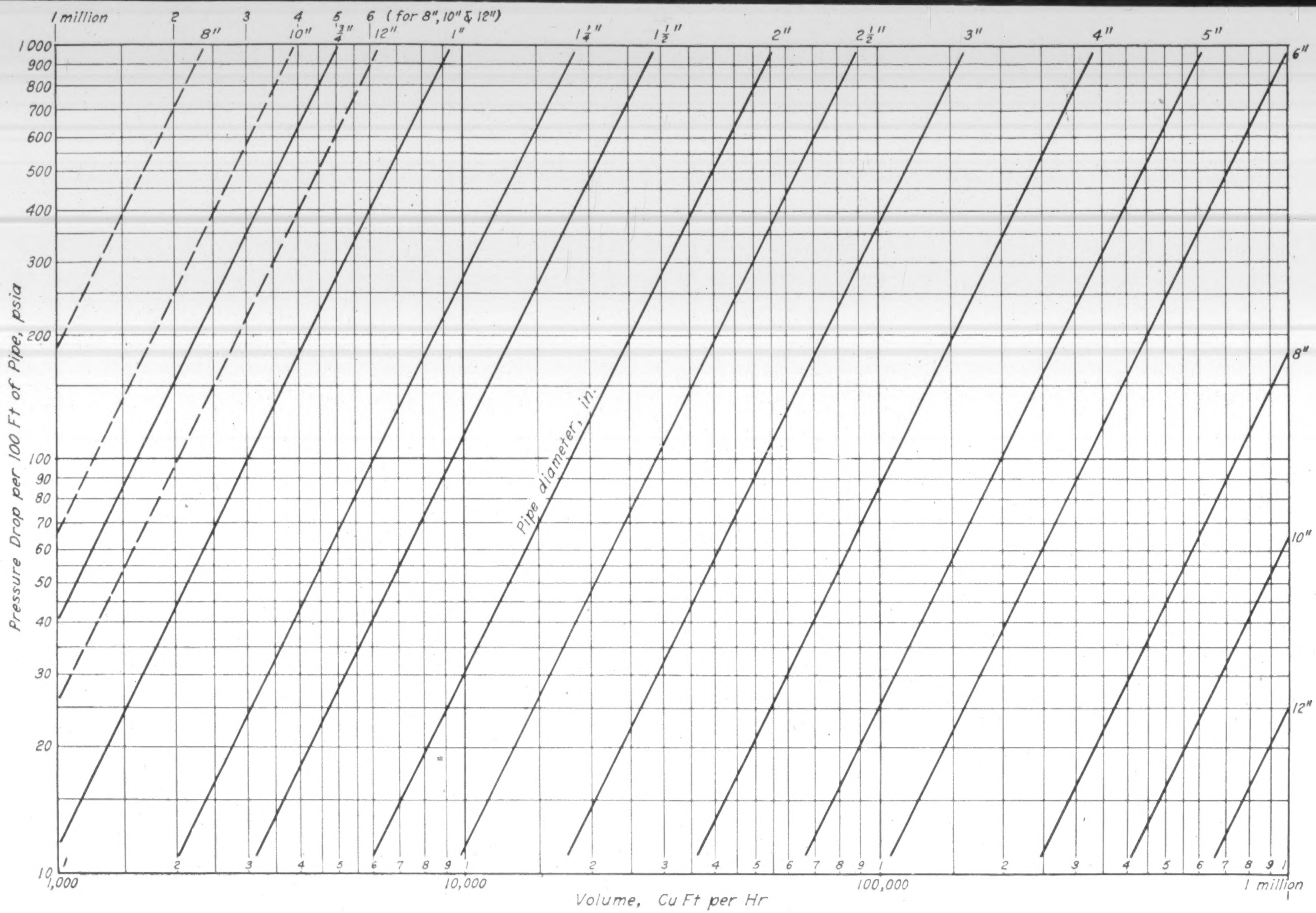
Pressure drop per 100 ft is:

$$(1394/1500)\,100 = 92.7 \text{ psia} \quad \ldots\ldots\ldots\ldots [23]$$

On the chart, a pressure drop of 92.7 psia per 100 ft in a 5 in. diam pipe line, is capable of handling 190,000 cfh of gas. ∓

Tear out along this line

HPAC DATA SHEET



HIGH PRESSURE GAS CHART simplifies design of piping by indicating required diameter, maximum rate of flow, permissible pressure drop, initial pressure, or final pressure when the rest of these values are known. The chart is based on the Weymouth formula for rate of flow in cubic feet of gas per hour

(Chart based upon following conditions: Gas at 60F, atmospheric pressure, and specific gravity of 0.60, with air = 1.0)

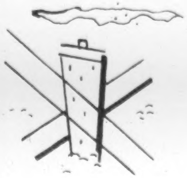
FEBRUARY 1957

Heating Piping & Air Conditioning

EXHIBIT HOURS

Monday, February 25, 2 p.m. to 10 p.m.
Tuesday, February 26, Noon to 10 p.m.
Wednesday, February 27, Noon to 10 p.m.
Thursday, February 28, Noon to 10 p.m.
Friday, March 1, Noon to 6 p.m.

HOW TO GET THERE FROM DOWNTOWN



BY AUTO—from loop go south on Michigan Avenue and turn west on 43rd St.

BY SUBWAY AND ELEVATED—trains leave downtown at Washington and State Sts. or State and Monroe Sts. every seven minutes. Transfer at Indiana Avenue Station (4100 South). Trains leave there every fifteen minutes for stockyards. This schedule is in effect from 7 a.m. until midnight.

SPECIAL BUSES — leave from downtown (loop) hotels periodically during show hours; return from show to Loop as loaded.

HOSPITALITY ROOMS

COMPANY	HOTEL	ROOM	TIME

PHONE NUMBERS

NAME	NUMBER

A HANDY SHOW GUIDE

. . . makes it easy to plan your tour of the show — in advance — so you don't miss those exhibits you particularly want to see. Tear out the card along the vertical perforation, fold it down to pocket size on the horizontal scored marks. See the instructions at right, below, on how you'll want to use this "show guide" at the International Heating & Air Conditioning Exposition.

TEAR OUT THIS CARD

SHOW GUIDE—containing a diagram of Exposition area with space to list (1) the exhibits you want to see, (2) hospitality rooms, (3) phone numbers — as well as other helpful show information.

THIRTEENTH
INTERNATIONAL HEATING &
AIR-CONDITIONING
EXPOSITION
INTERNATIONAL AMPHITHEATRE, CHICAGO
FEB. 25-MAR. 1, 1957

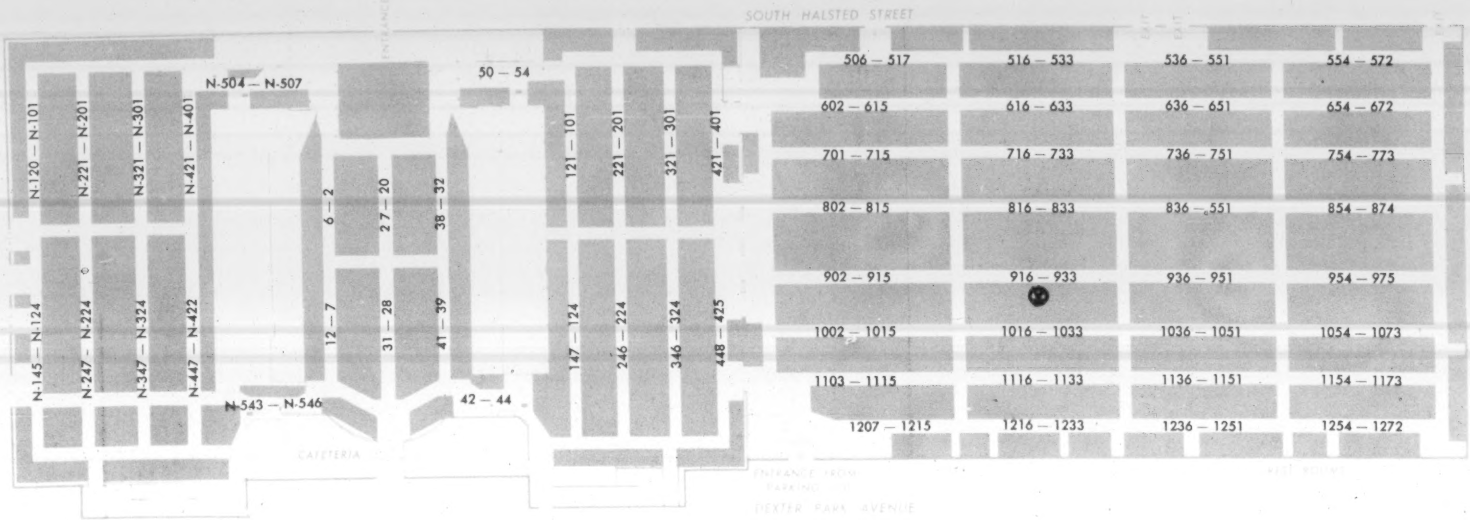
HERE'S HOW TO USE THIS HANDY SHOW GUIDE

As you study the list of exhibitors and their products, both in the advertisements in this issue and in the following show section, jot down the company names and their booth numbers of those exhibits you particularly want to see—in the space provided below the diagram on the backside of this card. You may want to do this before you leave for Chicago so that, before starting out on your tour of the show, you have located the exhibit spaces on the diagram and have marked them. With this done, it will be easy for you to plan your route so you are sure to see those exhibits important to you.

TEAR OUT THIS CARD, FOLD IT, AND CARRY IT WITH YOU TO THE SHOW.

For show information, or just a place to sit and relax, visit the Heating Piping & Air Conditioning booth — No. 924

13th INTERNATIONAL HEATING & AIR-CONDITIONING EXPOSITION


SOUTH HALSTED STREET
ENTRANCE
EXIT
EXIT
EXIT
N-120 — N-101
N-221 — N-201
N-321 — N-301
N-421 — N-401
N-145 — N-124
N-247 — N-224
N-347 — N-324
N-447 — N-422
N-504 — N-507
N-543 — N-546
6 — 2
27 — 20
38 — 32
12 — 7
31 — 28
41 — 39
50 — 54
42 — 44
121 — 101
221 — 201
321 — 301
421 — 401
147 — 124
246 — 224
346 — 324
448 — 425
506 — 517
516 — 533
536 — 551
554 — 572
602 — 615
616 — 633
636 — 651
654 — 672
701 — 715
716 — 733
736 — 751
754 — 773
802 — 815
816 — 833
836 — 551
854 — 874
902 — 915
916 — 933
936 — 951
954 — 975
1002 — 1015
1016 — 1033
1036 — 1051
1054 — 1073
1103 — 1115
1116 — 1133
1136 — 1151
1154 — 1173
1207 — 1215
1216 — 1233
1236 — 1251
1254 — 1272
CAFETERIA
ENTRANCE FROM PARKING LOT
DEXTER PARK AVENUE
REST ROOMS

EXHIBITOR	BOOTH	EXHIBITOR	BOOTH

A HANDY SHOW GUIDE

. . . makes it easy to plan your tour of the show — in advance — so you don't miss those exhibits you particularly want to see. Tear out the card along the vertical perforation, fold it down to pocket size on the horizontal scored marks. See the instructions at right, below, on how you'll want to use this "show guide" at the International Heating & Air Conditioning Exposition.

TEAR OUT THIS CARD

SHOW SECTION

spotlighting the . . .

13th International Heating & Air-Conditioning Exposition

63rd Annual Meeting of the American Society of Heating and Air-Conditioning Engineers

CHICAGO
February 25 — March 1

Complete information—Highlights of the Week, Program of the Meeting, Names and Addresses of Exhibitors, Products and Equipment on Exhibit

Meeting, Show To Be "Biggest Yet"

ASHAE Annual Meeting and International Heating and Air-Conditioning Exposition Both Expected to Set Attendance Records

Both the 63rd annual meeting of the American Society of Heating and Air-Conditioning Engineers, and the 13th International Heating and Air-Conditioning Exposition, to be held in Chicago this month, are expected to set new high records of attendance, according to ASHAE President John W. James.

Headquarters for the meeting — with technical sessions and other events February 25-28 — is the Conrad Hilton hotel, and the concurrent exposition — open February 25-March 1 — with some 500 displays will be at the International Amphitheatre. (Quite suitably, the Hilton announced the signing a few weeks ago of a $9 million contract to air condition its 3000 rooms. The amphitheatre was extensively air conditioned for the 1952 national political conventions, and has added air conditioned space since then.)

The presentation of 13 papers and the discussions at two symposiums will provide valuable technical information for those attending the ASHAE meeting. Registration, sessions and most committee meetings will take place in the Conrad Hilton. Simultaneously with the opening of the meeting, the exposition will take place, under the auspices of the ASHAE and the management of the International Exposition Co., of which E. K. Stevens is president.

In advance of the technical sessions, many of the Society committees will hold meetings relative to their own particular activities, beginning on Saturday, February 23.

Various special events (see the program) for Society members, their families and guests have been planned by the ASHAE Illinois Chapter committee on arrangements, of which Peter J. Marschall is chairman.

To Install New Officers

The report of the Inspectors of Election of Society officers, Council members, and the Committee on Research will be presented at the second session on Tuesday morning, February 26. Nominees are: President, Peter B. Gordon, New York City; First Vice President, Elmer R. Queer, University Park, Pa.; Second Vice President, Arthur J. Hess, Los Angeles; and Treasurer, Charles H. Pesterfield, East Lansing, Mich. For three year terms on the Council: Richard S. Dill,* Washington, D.C.; William G. Hole, Montreal; Peter J. Marschall, Chicago; and Wesley O. Stewart, Los Angeles. Candidates for three year terms on the Committee on Research are: Dominic D'Eustachio, Pittsburgh; Elbert S. Howarth, New Kensington, Pa.; Howard R. Limbacher, Kalamazoo; Edwin F. Snyder, Minneapolis; and John I. Trimble, Columbus, Ohio. The candidate nominated to serve out a one year term is Paul H. Yeomans, Philadelphia.

The introduction and installation of the 1957 officers will take place at the annual banquet on Wednesday evening in the grand ballroom of the Conrad Hilton. Also at that time the Past President's Award will be presented to John W. James and the Society's coveted F. Paul Anderson Medal will be given to M. K. Fahnestock, Urbana, Ill., research professor of mechanical engineering and chairman of the Physical Environment Unit of the University of Illinois. The banquet speaker is Dr. Preston A. Bradley, pastor of Peoples Church, Chicago, his subject being Facing the Future.

On the opening day of the annual meeting there will be a Welcome luncheon following the conclusion of the morning session. The luncheon speaker is Dr. Richard Heflebower, chairman of the economics department at Northwestern University; his subject is Revolutions in Our Times.

Booth 701, the exhibit of the Society at the exposition, will feature a live demonstration of sound measurement, and will focus attention on the research, publication and membership activities of the Society for the advancement of professional knowledge during the past 63 years.

The exposition hours are 2 to 10 p.m. Monday, 12 to 10 p.m. Tuesday, Wednesday and Thursday, and 12 to 6 p.m. on Friday, the closing day. Bus transportation will be available daily from the Loop hotels to the International Amphitheatre.

Monday Technical Sessions

Each of the six technical sessions of the annual meeting will be called to order at 9:30 a.m. at the Conrad Hilton. The papers and symposiums, in order of presentation, are as follows:

Study of Three Redwood Cooling Tower Packings, by Wesley W. Smith, associate research engineer, Texas Engineering Experiment Station, Texas A. & M. College System, is a report of several hundred tests of three types of redwood cooling tower packings. Purpose of the study was to obtain fundamental information on mass transfer and resistance to air flow in various cooling tower packings, and also to determine why some cooling tower manufacturers preferred certain packing types, as well as to indicate ways for improving packings.

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*Deceased January 17, 1957.

USE THE HANDY guide to the Exposition to plan your visit, save your time (see second preceding page) . . . On following pages, see complete program of meeting, listing of exhibits, diagram of the Show layout, helpful advice on attending the meeting, looking at the exhibits.

Earth as Heat Source and Sink for Heat Pumps, by D. M. Vestal, Jr., research engineer, and B. J. Fluker, assistant research engineer, both of Texas Engineering Experiment Station, Texas A. & M. College System, presents the results of an extensive investigation of the earth at shallow depths as a heat source and sink for the heat pump. The paper also contains a buried coil design equation derived from this study.

From '36 to '56: Air Conditioning Comes of Age, by Walter A. Grant, vice president, central engineering staff, Carrier Corp., Syracuse, N.Y., is the last paper of the first session and it is a history of 20 years progress in air conditioning, pointing out the many advancements made in equipment and methods.

Two Sessions Tuesday

Revised Winter Outside Design Temperatures, by H. C. S. Thom, U. S. Weather Bureau and presently chief climatologist, President's Advisory Committee on Weather Control, Washington, D.C., is a discussion in general terms of the problem of developing winter design temperatures. Simplifying assumptions are introduced which make possible the development of design values from available information. Climatological analysis is applied on this basis and this provides a range of design values offering the advantage of flexibility in application. This paper is a result of study conducted under guidance of the TAC on Weather Data with the ultimate objective of making revised data available for use of everyone concerned.

Analysis of an Air Conditioning Thermal Circuit by an Electronic Differential Analyzer is a paper which is the result of work carried on by the ASHAE at its Research Laboratory in Cleveland, Ohio. The authors are G. V. Parmelee, senior research supervisor, ASHAE Re-

Quick Picture of the "Big Week"

ASHAE MEETING . . . .

Technical sessions at 9:30 a.m. Monday, Tuesday, Wednesday and Thursday at the Conrad Hilton, simultaneous sessions being held Tuesday and Wednesday. See program for full information.

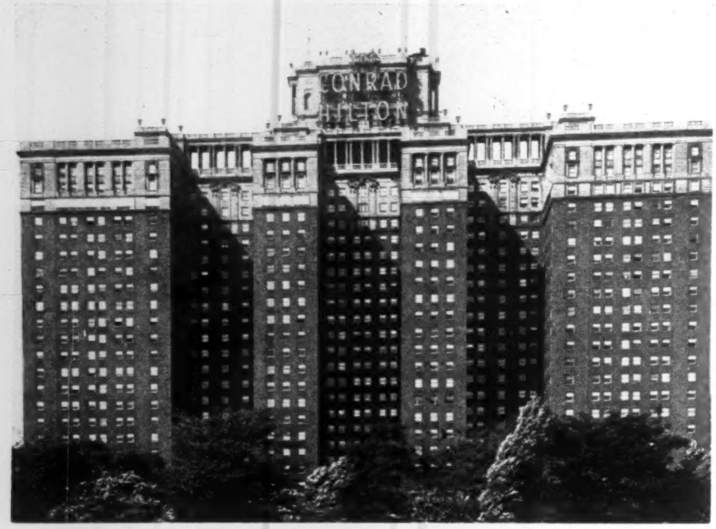
EXPOSITION . . . .

Opens Monday at 2 p.m. at the International Amphitheatre and daily Tuesday through Friday at 12 noon. Closing hour each day is 10 p.m., except Friday at 6 p.m. See list of exhibitors and diagram of the exposition layout for full information on "who, what and where."

THE LIGHTER SIDE . . . .

ASHAE reception (with refreshments) Sunday at 3 p.m. at the Conrad Hilton . . . . Welcome luncheon at the Conrad Hilton, 12 noon on Monday . . . . Ladies "Talent and Tea" at the Sheraton Blackstone, 2:30 p.m. on Monday . . . . Informal reception and dinner in honor of Dr. Arthur Cutts Willard and four former associates, Monday at 5 p.m. at the Conrad Hilton . . . . Get-together party, Monday evening at 9 at the Conrad Hilton . . . . ASHAE Life Members "dutch treat" luncheon, Tuesday at 12:15 . . . . ASHAE Past Presidents' dinner, Tuesday, 7 p.m. . . . . Luncheon and entertainment for ladies at South Shore Country Club, Wednesday at 12:30 . . . . Annual ASHAE banquet at the Conrad Hilton, Wednesday at 7 p.m.

Air Conditioned Hotel . . .



The trees in Grant Park, across Michigan Ave. from the Conrad Hilton, meeting headquarters, don't look this way this month but this summer scene is appropriate as the Hilton recently announced award of a contract for air conditioning its 3000 rooms.

Air Conditioned Hall . . .

This space at the International Amphitheatre will be filled with equipment displays rather than delegates to a political convention this month. The arena was air conditioned for the 1952 conventions.

search Laboratory and now with the Arabian-American Oil Co., Dhahran, Saudi-Arabia; P. Vance, Goodyear Aircraft Corp., Akron, Ohio and now at Massachusetts Institute of Technology, Lincoln Laboratory, Cambridge, Mass.; and A. N. Cerny, research mathematician, ASHAE Research Laboratory. The test results obtained, it is believed by the authors and explained in this paper, demonstrate that the differential analyzer can be applied to solving practical problems of considerable complexity and will give engineers results with satisfactory precision.

Pulsations in Residential Heating Equipment presents the preliminary results of research jointly sponsored by the ASHAE, the AGA and OHI, conducted at the Battelle Memorial Institute as a part of the ASHAE research program. The authors are A. A. Putnam and W. R. Dennis, assistant division chief and principal physicist, respectively, at Battelle in Columbus, Ohio. Objectives included defining the fundamental nature of the pulsations and finding methods for their suppression or complete elimination. Motion picture studies and a record of the effects of important factors such as varying air-fuel ratios on oscillation are noted. Tests were conducted of both oil and gas fired furnaces.

The Dust Spot Method for Evaluating Air Cleaners is the result of research sponsored by ASHAE in cooperation with the Mechanical Engineering Department, University of Minnesota. The study was conducted by K. T. Whitby, research associate; A. B. Algren, professor; and R. C. Jordan, professor and head, all of the Mechanical Engineering Dept., University of Minnesota. With the dust spot method, dust laden air is drawn through a filter paper and the resulting spot is evaluated by visual comparison or by photometric measurement of the light transmitted or reflected by the paper. As a result of this study, the authors present a number of conclusions relative to the use of the dust spot method of evaluation.

A Symposium on Dehumidification, moderated by John Everetts, Jr., Philadelphia will be conducted simultaneously Tuesday morning with the aforementioned session. Dehumidification by Refrigeration, Solid Sorbents, and Liquid Sorbents will be discussed by Walter E. Ellis, W. L. Ross and E. W. Gifford. The Economics of Dehumidified Storage will be presented by G. W. Higgs, Jr., and Prof. E. R. Queer will describe Typical Dehumidification Problems and Their Solutions.

And Two Wednesday Sessions

Cold Wall Effects In a Ceiling Panel Heated Room, by L. F. Schutrum, supervising engineer, and T. C. Min, research engineer, both of the ASHAE Research Laboratory, concerns the combined effect of a cold wall or window and a heated ceiling panel on room air temperature, mean radiant temperature and air motion. Tests were made in the ASHAE environment room with heated panel areas near the cold wall to determine the extent to which such an arrangement could increase the air temperature and the radiant temperatures near the cold surface. Descriptions of the test procedures and the authors' conclusions are included in the paper.

Performance of Covered Hot Water Floor Panels, Part II — Room Conditions, by E. L. Sartain, head of the heating experimental laboratory, Modine Mfg. Co. and W. S. Harris, research professor of mechanical engineering, University of Illinois, is the second of a series concerning a panel heating investigation being conducted at the University of Illinois in cooperation with the Institute of Boiler and Radiator Manufacturers. Part I was a discussion of the effects of various floor coverings on the thermal characteristics of floor panels.

Thermal Design of Warm Water Concrete Floor Panels presents a simplified procedure for use in residences and commercial buildings. It complements the paper Thermal Design of Warm Water Ceiling Panels published in the ASHAE Transactions, Vol. 62, 1956. The procedures in both papers are based on experimental data obtained at the ASHAE Research Laboratory under the guidance of the ASHAE Technical Advisory Committee on Panel Heating and Cooling.

A Symposium on Industrial Ventilation, moderated by Prof. C. H. Pesterfield, East Lansing, Mich., will also be held concurrently Wednesday morning with the previous session. Subjects included are Control of the Industrial Environment, Peter J. Marschall, Chicago; Contaminant Control, K. E. Robinson, Detroit; Cleaning Industrial Effluent, J. M. Kane; Louisville; Summer-Winter Comfort Ventilation for Industry, B. R. Small, Pittsburgh; and Dust Particle Inertia and Various Consequences, W. C. L. Hemeon, Pittsburgh.

Last Session Thursday

Outlet Characteristics That Affect the Downthrow of Heated Air Jets, a paper which results from research sponsored by the ASHAE in cooperation with the Engineering Experiment Station of Kansas State College, was prepared by Linn Helander, professor and head; S. M. Yen, associate professor; and Wilson Tripp, professor, all of the Mechanical Engineering Dept., Kansas State College. The research was conducted under the guidance of the ASHAE Technical Advisory Committee on Air Distribution as a part of the Society research program and the data obtained will be of value to designers and application engineers.

Air Flow in Free Convection Over Heated Bodies is another paper which is the result of research sponsored by the ASHAE, in this case in cooperation with the Graduate School of Public Health, University of Pittsburgh and prepared by T. F. Hatch, of the Department of Occupational Health and D. Barron-Oronzco, Direccionde Hygiene Industrial, Mariano Escobedo #20, Mexico, D.F. Mr. Barron-Oronzco formerly was with the Department of Occupational Health, University of Pittsburgh. A part of the ASHAE research program, the material in this paper may be used as a basis for determining exhaust ventilation requirements for hot processes in industry.

Radioactive Process Ventilation, by S. H. Glassmire and J. P. Wahlen, staff members at the University of California Los Alamos Scientific Laboratory, summarizes ventilation requirements for laboratories handling radioactive materials. Working with atomic energy, it is pointed out, presents the industrial or occupational hazard of exposure to the effects of ionizing radiation. Generally this is minimized by shielding and by ventilation. Shielding reduces exposure by radiation outside the body, and proper ventilation is a prime precaution against internal exposure.

This paper concludes the final technical session of the 63rd annual meeting. Prior to adjournment, Pres. John W. James will call for the report of the resolutions committee and any unfinished or new business. The exposition will also be open on Friday from 12 noon to 6 p.m., however.

The next meeting of the Society will be the semi-annual meeting, June 24-26, 1957 at Murray Bay, Quebec. The 64th annual meeting will be in Pittsburgh, January 27-29, 1958.

turn page for complete Program ➡

PROGRAM

63rd Annual Meeting

AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS

Chicago, February 25-28, 1957

(Registration, Technical Sessions, and Meetings at The Conrad Hilton unless otherwise designated)

Saturday — February 23

9:00 a.m. Membership Committee, B. W. Farnes, *Chairman*

10:00 a.m. Executive Committee, P. B. Gordon, *Chairman*

2:00 p.m. Finance Committee, A. J. Hess, *Chairman*

2:00 p.m. Research Executive Committee, B. H. Jennings, *Chairman*

2:00 p.m. Regions Central Committee, E. R. Queer, *Chairman*

Sunday — February 24

10:00 a.m. REGISTRATION (*Beverly Room*)

10:00 a.m. Council Meeting (*Lipton Room — Stock Yards Inn*)

10:00 a.m. Committee on Research, B. H. Jennings, *Chairman*

3:00 p.m. Reception and Refreshments with an Hawaiian accent

Monday — February 25

9:00 a.m. REGISTRATION (*Normandy Lounge*)

9:30 a.m. FIRST SESSION (*Waldorf Room*)
Call to Order — Pres. John W. James

Greetings by P. J. Marschall, Chairman Committee on Arrangements
Report of President — John W. James
Report of Council — A. V. Hutchinson
Report of Treasurer — R. A. Sherman
Study of Three Redwood Cooling Tower Packings, by W. W. Smith
Earth as Heat Source and Sink for Heat Pumps, by D. M. Vestal, Jr. and B. J. Fluker
From '36 to '56: Air Conditioning Comes of Age, by W. A. Grant

12:00 noon WELCOME LUNCHEON (*Grand Ballroom*)
Toastmaster: C. M. Burnam, Jr.
Speaker: Dr. Richard Heflebower, Chairman, Economics Dept., Northwestern University

2:00 p.m. EXPOSITION — Opening of 13th International Heating and Air Conditioning Exposition (*International Amphitheatre*). ASHAE Booth 701.

2:15 p.m. TAC on Air Cleaning, E. F. Snyder, Jr., *Chairman*

2:15 p.m. TAC on Air Distribution, W. O. Huebner, *Chairman*

2:15 p.m. TAC on Hot Water and Steam Heating, H. A. Lockhart, *Chairman*

2:15 p.m. TAC on Solar Energy Utilization, R. C. Jordan, *Chairman*

2:30 p.m. Ladies Talent and Tea (*Crystal Ballroom*, Sheraton Blackstone Hotel)

5:00 p.m. Informal Reception and Dinner for Dr. Arthur Cutts Willard* (*Williford Room*)

9:00 p.m. Get-Together Party (*Grand Ballroom*)

Tuesday — February 26

9:00 a.m. REGISTRATION (*Normandy Lounge*)

9:30 a.m. SECOND SESSION (*Waldorf Room*)
Call to Order — 1st Vice Pres. P. B. Gordon

Report of Committee on Research — B. H. Jennings, *Chairman*
Revised Winter Outside Design Temperatures, by H. C. S. Thom
Analysis of an Air-Conditioning Thermal Circuit by an Electronic Differential Analyzer, by G. V. Parmelee, P. Vance and A. N. Cerny (by title only)
Pulsations in Residential Heating Equipment — Preliminary Results, by A. A. Putnam and W. R. Dennis
The Dust Spot Method for Evaluating Air Cleaners, by K. T. Whitby, A. B. Algren and R. C. Jordan
Report of Inspectors of Election

9:30 a.m. THIRD SESSION (*Grand Ballroom*)
Call to Order — Treas. R. A. Sherman

SYMPOSIUM ON DEHUMIDIFICATION
John Everetts, Jr., Moderator
Dehumidification by Refrigeration — Walter E. Ellis
Dehumidification by Solid Sorbents — W. L. Ross
Dehumidification by Liquid Sorbents — E. W. Gifford
Economics of Dehumidified Storage — G. W. Higgs, Jr.
Typical Dehumidification Problems and Their Solution — E. R. Queer

12:00 noon EXPOSITION

12:15 p.m. Life Members' Dutch Treat Luncheon

1:30 p.m. Nominating Committee Meeting

2:00 p.m. Guide Committee, M. W. Keyes, *Chairman*

2:15 p.m. TAC on the Heat Pump, F. R. Ellenberger, *Chairman*

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*Friends and associates of Dr. Willard, a past president of the ASHAE, will pay a special tribute to him.

2:15 p.m. Joint meeting of TAC on Industrial Environment, P. J. Marschall, *Chairman;* and TAC on Physiological Research, M. K. Fahnestock, *Chairman*

2:15 p.m. TAC on Sorption, G. L. Simpson, *Chairman*

2:15 p.m. TAC on Sound and Vibration Control, H. A. Lockhart, *Chairman*

7:00 p.m. Past Presidents' Dinner

7:30 p.m. TAC on Heat Transfer Through Fenestration, R. W. McKinley, *Chairman*

7:30 p.m. TAC on Heating and Air Conditioning Loads, H. T. Gilkey, *Chairman*

7:30 p.m. TAC on Insulation, M. W. Keyes, *Chairman*

7:30 p.m. TAC on Thermal Circuits, S. F. Gilman, *Chairman*

7:30 p.m. TAC on Plant and Animal Husbandry, A. J. Hess, *Chairman*

Wednesday — February 27

9:00 a.m. REGISTRATION (*Normandy Lounge*)

9:30 a.m. FOURTH SESSION (*Waldorf Room*)
Call to Order — 1st Vice Pres. P. B. Gordon
Cold Wall Effects in a Ceiling-Panel-Heated Room, by L. F. Schutrum and T. C. Min
Performance of Covered Hot Water Floor Panels, Part II, by E. L. Sartain and W. S. Harris
Thermal Design of Warm Water Concrete Floor Panels — A Design Manual prepared by a subcommittee of TAC on Panel Heating and Cooling and members of the staff of the ASHAE Research Laboratory

9:30 a.m. FIFTH SESSION (*Grand Ballroom*)
Call to Order — 2nd Vice Pres. E. R. Queer
INDUSTRIAL VENTILATION SYMPOSIUM
C. H. Pesterfield, Moderator
Control of the Industrial Environment — P. J. Marschall
Contaminant Control — K. E. Robinson
Cleaning Industrial Effluent — J. M. Kane
Summer-Winter Comfort Ventilation for Industry — B. R. Small
Dust Particle Inertia and Various Consequences — W. C. L. Hemeon

12:00 noon EXPOSITION

12:30 p.m. Ladies Luncheon and Entertainment (South Shore Country Club)

2:00 p.m. Organization Meeting of 1957 Committee on Research

7:00 p.m. ANNUAL BANQUET (*Grand Ballroom*)
Toastmaster: W. A. Kuechenberg
Speaker: Dr. Preston Bradley, Pastor of Peoples Church, Chicago
Introduction and Installation of 1957 officers
Presentation of Past President's Award to John W. James
Presentation of F. Paul Anderson Medal to M. K. Fahnestock

Thursday — February 28

9:00 a.m. REGISTRATION (*Normandy Lounge*)

9:30 a.m. SIXTH SESSION (*Waldorf Room*)
Call to Order — Pres. John W. James
Outlet Characteristics That Affect the Downthrow of Heated Air Jets, by Linn Helander, Shee-Mang Yen, and Wilson Tripp
Air Flow in Free Convection over Heated Bodies, by T. F. Hatch and D. Barron-Oronzco
Radioactive Process Ventilation, by S. H. Glassmire and J. P. Wahlen
Report of Resolutions Committee
Unfinished Business
New Business
Adjournment

12:00 noon EXPOSITION

1:00 p.m. Organization Meeting of 1957 Council

(*The Exposition will also be open Friday from 12 noon to 6 p.m.*)

Committee Chairmen for ASHAE Meeting

General Chairman: Peter J. Marschall.
Vice Chairman: Harry G. Gragg.
Honorary Chairmen: Harry M. Hart, Samuel R. Lewis, Arthur C. Willard.
Banquet Toastmaster: William A. Kuechenberg.
Ticket Reservations: G. Gill Freyder.
Entertainment: Joseph S, Kearney.
Hospitality: Herbert Kreisman.
Reception: M. W. Bishop.
Finance: E. P. Heckel, Jr.
Ladies: Mrs. Harry G. Gragg and Manuel J. Bamond.
Publicity: Robert W. Roose.
Banquet: George V. Zintel.
Sessions: Lawrence O. Paul.
Transportation: Harold C. Stevens.
Registration: Robert J. Salinger.
Inspection Trips: John C. Scott.
Information: Edward R. Teske.
Facilities: Henry J. Couch.
Get-Together Party: Louis H. Streb.
Exposition: Will G. Pennington.
Welcome Luncheon: C. M. Burnam, Jr.
Orchestra, Acts: Harvey E. Anderson.

Engineer Develops as He Serves

... professional society meetings provide inspiration, friendships, and challenging opportunities to help advance the practice and knowledge of heating and air conditioning

By Samuel R. Lewis

In 1906 the American Society of Heating and Ventilating Engineers, now called the American Society of Heating and Air-Conditioning Engineers, held its first summer meeting in Chicago.

I had joined the society that year, and I attended all the sessions. I have a photograph of the dinner party held in the old Auditorium hotel. Nearly all of the men shown in that picture have since gone ahead, leaving me to express their spirit of devotion to the ideals of the organization.

I remember particularly the discussions of engineering presentations by such men as Professor Kinealy of St. Louis, Thomas Waters, chief engineer of the Chicago board of education, George Mehring and William A. Pope, outstanding engineers-contractors, and the Mackay brothers.

Friendships Spark Interest

The friendship of these men to me, a novice, started the train of interest and participation that has endured for 50 years. Association with such educators as Carpenter of Cornell, Kent of Syracuse, Rowley of Minnesota, Willard of Illinois, Larson of Wisconsin, who attended faithfully most of the society sessions, has continued to be an inspiration to me. By "educators" I mean not only nationally renowned deans of science in universities, but also the experienced thinker-educators who may not have had degrees, but who practice the profession of designing and installing equipment for heating, piping, and air conditioning systems in all types of buildings.

The leaders in our profession always have been remarkable for their generosity and friendliness, and are outstanding to this day for these qualities.

I have participated in committees, such as those that developed tables of pipe sizes for steam and hot water heating, and have been helped by more experienced men to implement them. The society has assisted materially in promoting health as well as comfort in living.

Many Pleasures

I never refused to embrace an opportunity to exploit my ignorance in society service, but I accumulated and sometimes recorded a part of the data that the older men had employed but had not disseminated. I knew and worked with the men who first developed the ASHVE Guide, and ultimately I came to re-edit the early editions.

I knew the men who founded the society's research program and was allowed to assist them. I watched the laboratory develop, first in New York, then in Pittsburgh in association with the Bureau of Mines, and at present in Cleveland.

Eventually, as chairman of the committee on research, I helped develop cooperative research with several of the universities.

Through all these years, due to the friendship of the members of our society, I have acquiesced in serving through nearly all of the elective and appointive functions of the society.

I have traveled and lectured for the society from the Gulf of Mexico to Canada and from the Pacific to the Atlantic oceans, in many of the great institutions of learning, and have known and have admired the men who direct the engineering activities in these places of learning. Without these contacts through our society my life would have been much less happy.

Meetings Valuable

This message, then, is intended to suggest that any young engineer will have as favorable a chance as I had, if he attends the meetings of the society, either national gatherings or the local monthly chapter meetings. These chapters are increasing in number, and they teem with local experiences to challenge any engineer.

If the young engineer gives to others, he will thereby present to the others the pleasure of giving. This will enrich the lives of us all.

SAMUEL R. LEWIS, *consulting mechanical engineer, is a past president of the American Society of Heating and Air-Conditioning Engineers.*

Use Handy Show Guide in Chicago

. . . to get the most out of the 13th International Heating and Air-Conditioning Exposition

No one sufficiently interested in heating and air conditioning to attend the annual meeting of the American Society of Heating and Air-Conditioning Engineers in Chicago, February 25-28, should miss seeing the International Heating and Air-Conditioning Exposition in the International Amphitheater, February 25-March 1. Held only once in two years, the show is the greatest collection and display of products and equipment in this field that can be found in any one place in the world.

A trip to the Exposition, aside from transportation, will cost the visitor nothing but his time, for there is no admission charge. A registration card filled out by the visitor is all that is needed for admittance.

Exposition Is for You

This Exposition is planned for you! It can give you more information and a better understanding than could be obtained from poring through countless catalogs or other published literature.

If you are a representative of one or more manufacturers, you may see at the Exposition applications of products allied with your own that may suggest wider uses of the product you sell. Some exhibits will undoubtedly create ideas for new developments.

The Exposition also provides visual education. Here you will see, in most cases, the full size physical dimensions of products you may previously have seen only in illustrations. You will see how they line up with other products if they are component parts of a system. Many of the exhibits will be operating, so that the visitor may realize possibilities which some catalogs may not suggest. Exhibitors' representatives in attendance at the exhibits can answer questions relating to the products and their applications.

Plan Your Visit in Advance

As this is really a Big Show, a little planning in advance as to how you are to see it will be well worthwhile. The time element may be important to some visitors, and to wander about the Exposition aimlessly might be both unsatisfactory and tiring. For that reason it is suggested that you plan your visit to the show before you get there. Is your interest merely general or is it specific? Surely there are certain products that you will want to see displayed and certain exhibitors that you will want to meet if only to renew acquaintances.

To assist the visitor to the Exposition, this Show Section has been compiled, giving the names of exhibitors and a brief description of what products will be displayed. A Show Guide is also included ahead of this section. This will be found very useful, for it contains a floor plan of the entire Exposition showing locations and numbers of exhibit spaces. A convenient feature of this card is that it can be folded to pocket size. Space is provided on it for dates and notes that can be jotted down as you go through the show.

Walk Right Through First Time

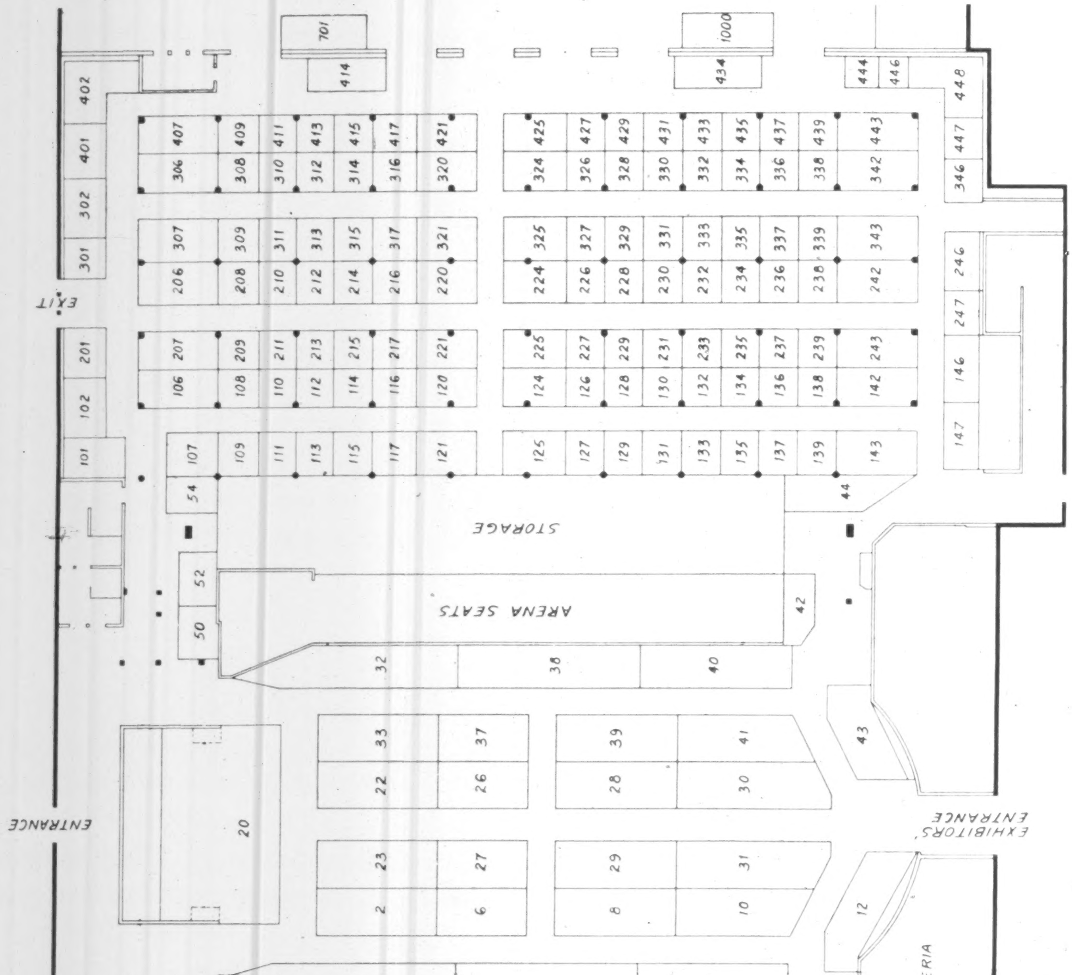
Having arrived at the International Amphitheater it is suggested that the visitor first walk through the whole Exposition without stopping. In doing so a definite path should be followed such as starting at either outside aisle and going up and down parallel aisles. This will give you a general idea of the layout of the Exposition. This method is suggested because it is very easy to be detained at some exhibits at the start, and if that is the case, visitors with limited time at their disposal may not be able to see the entire Exposition. So we say, keep going the first time there and plan to go again.

On this first time around, have your Show Guide card in hand and circle or indicate on the floor plan certain exhibit spaces that you will want to return to later. That will help you get oriented and will save your time in returning to the exhibits that you especially want to see. While making this first trip through the show you will undoubtedly find some exhibits that you may not have thought of before. Perhaps some particular exhibit will attract your attention. Make a note of it so that you will surely stop there on your next trip through the show.

Register for More Literature

For the benefit of exhibitors, a word about product literature is in order. It is not possible in each exhibit to have a sufficient supply of product literature to give to each visitor. For that reason you may be asked to leave your name and address so that literature can be sent to you. Some visitors hesitate to do that, but if you are really interested and entitled to receive the literature, you should be willing to accede to such requests. Product literature is expensive to produce and the exhibitor producing it is entitled to know that it reaches the right people.

The thoughts expressed here are those of one who has been both an exhibitor and a visitor for many years. It is hoped that they may be helpful. In any case, don't miss this great show!—D. L. Mills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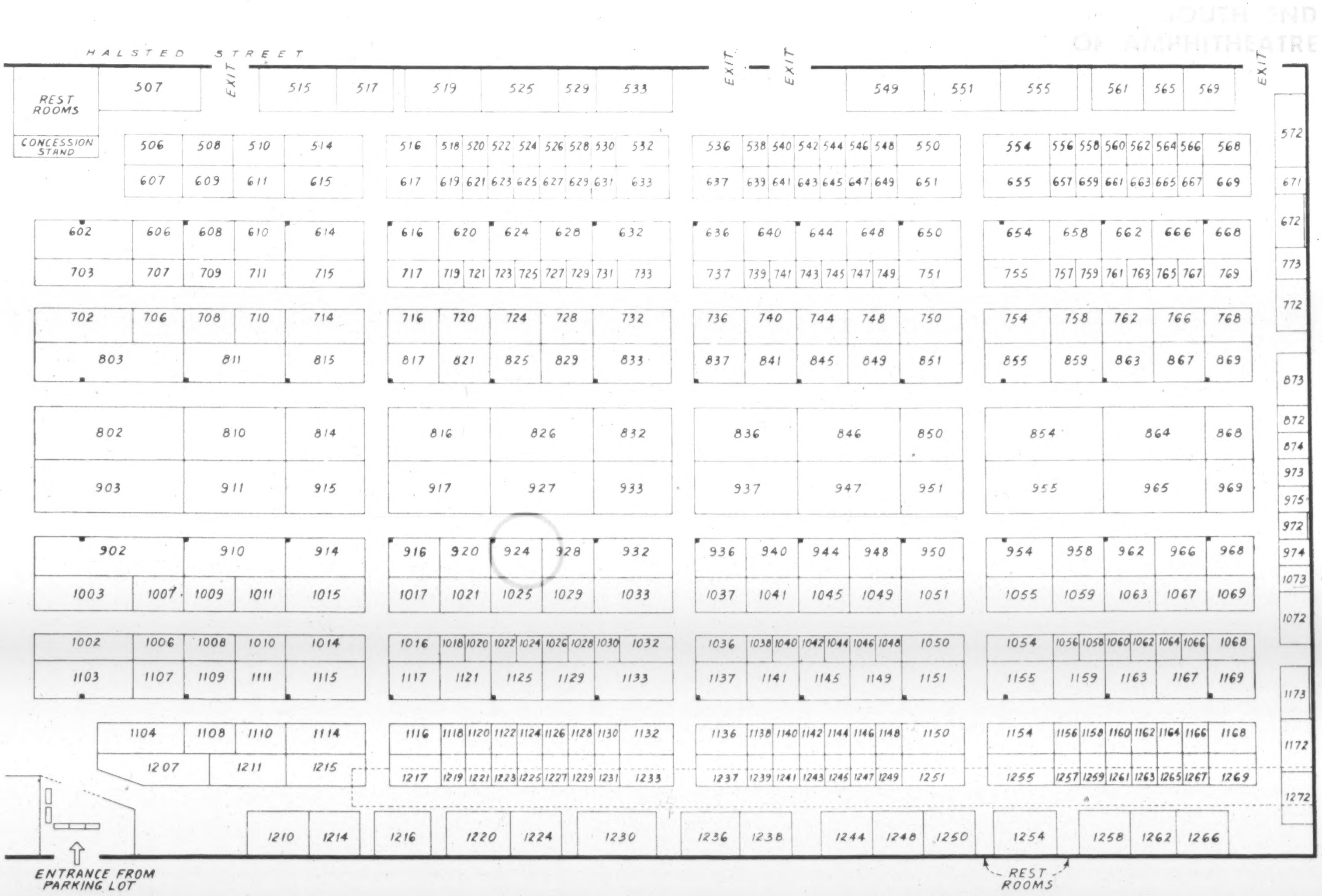
Layout of the Exposition

For further information, you are invited to inquire at the Keeney Publishing Co. — publisher of Heating, Piping & Air Conditioning and of American Artisan — exhibit in Booth No. 924



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EXPOSITION EXHIBITORS AND THEIR EXHIBITS

HERE ARE THE names of the exhibitors who are scheduled for the 13th International Heating & Air-Conditioning Exposition, per latest advice at press time from the exposition management.

Those listed with information on the products they will exhibit and the names of representatives who will be in attendance furnished these details direct to the publisher. With the booth numbers and the accompanying diagram of the exhibit hall, which are published here, each exhibitor is easily located.

The exposition is under the management of the International Exposition Co., E. K. Stevens, manager.

A-J MFG. CO., 3601 E. 18th St., Kansas City 27, Mo. — Booths 621, 623

In attendance: Arthur S. Hurt, Jr., Margaret E. Hurt, Ernest S. Preuitt.

Exhibiting: Air conditioning registers and grilles, no-vision door or partition grilles.

A-P CONTROLS DIV., CONTROLS CORP. OF AMERICA, 2450 N. 32nd St., Milwaukee 45, Wisc. — Booth 655

In attendance: Del Moerick, Jim Tate, John Hall, Willard Krueger, Larry Thompson, H. Welch.

Exhibiting: Refrigeration and air conditioning controls; gas and oil heating controls.

ACE ENGINEERING CO., 1435 W. 15th St., Chicago 8, Ill. — Booth 1141

In attendance: I. L. Schurman, R. W. Baroach, J. W. Cowan, A. F. Jelenc, R. E. Hoffman, S. Padove.

Exhibiting: Horizontal rotary oil burners for Nos. 5 and 6 fuel oil, and combination oil-gas burners. Improved forced draft packaged fuel oil burning systems for use with any pressurized scotch marine boilers will be featured.

ACME INDUSTRIES, INC., 600 N. Mechanic St., Jackson, Mich. — Booth 903

In attendance: K. A. Weatherwax, P. A. Weatherwax, W. R. Eichelberger, E. B. Dunphy, W. M. Hassenplug, D. G. Merrill, J. J. Bell, W. E. Lloyd, I. E. Corwin, Valdi Landman, H. W. Smith, Banks Edwards, Jay Harris, L. R. Smith, W. C. Rehor, K. D. Cunningham, L. Bonhotal.

Exhibiting: "Flow-Cold," "Flow-Therm" and "Flow-Pac" packaged liquid chillers; "Flow-Mizer" evaporative condensers and cooling towers; "Flow-Cold" cooling towers; shell and tube and shell and coil condensers; water coolers; remote room conditioners. New direct drive large tonnage packaged liquid chillers, new cooling towers with capacity range 3 through 100 tons, new air cooled packaged chiller for residential and commercial air conditioning and commercial and industrial process cooling, will be featured.

ACRO MFG. CO., THE, CRISE CONTROLS DIV., 2040 E. Main St., Columbus 16, Ohio — Booth 1008

ADDISON PRODUCTS CO., Railroad St., Addison, Mich. — Booths 649, 651

In attendance: V. C. Knight, H. M. Jones, L. G. Underhill, W. A. Hames, R. C. Robertson, K. F. Rumohr, S. E. Vickers, R. E. Cappel, J. H. Jenning.

Exhibiting: Air and water cooled residential air conditioners, dehumidifiers, compressor-condenser units, cooling units, special refrigerating systems.

AEROFIN CORP., 101 Greenway Ave., Syracuse 3, N. Y. — Booth 328

AEROQUIP CORP., Jackson, Mich. — Booth 129

AIRCONDITIONED AGE, 92 Martling Ave., Tarrytown, N. Y. — Booths 1239, 1241

Exhibiting: Publication.

AIR CONDITIONING, HEATING AND VENTILATING, 93 Worth St., New York 13, N. Y. — Booths 1016, 1018

Exhibiting: Publication.

AIR CONDITIONING & REFRIGERATION NEWS, 450 W. Fort St., Detroit, Mich.—Booth 668

Exhibiting: Publication.

AIR CONTROL PRODUCTS, INC., 357 Center St., Dept. B, Coopersville, Mich. — Booth 342

In attendance: R. L. Leigh, K. L. Babcock, Al G. Biela, George A. Arehart, and others.

Exhibiting: Registers, grilles and diffusers, including air conditioning registers, "Multi-Trol" commercial registers, ceiling diffusers, baseboard diffusers, and complete line of metal ventilators.

AIR CONTROLS, INC., 2310 Superior Ave., Cleveland 14, Ohio — Booth 425

In attendance: B. G. Krause, N. G. Busch, Robert Larkin, G. L. Schwarz, Bob Schwarz, H. T. Van Egmond.

Exhibiting: Air conditioning blowers, attic fans, exhaust fans, blower filter units, blower wheels.

AIR DEVICES, INC., 185 Madison Ave., New York 16, N. Y.—Booth 1015

In attendance: C. N. O'Day, G. J. Sweeney, P. G. Daves, J. O'Day, R. MacLean, R. Barry, T. A. Hughes.

Exhibiting: Square, rectangular, stripline (slot type), circular (adjustable and non-adjustable) "Agitair" diffusers; high pressure terminals; air and grease filters; exhausters. High pressure terminals for control and distribution of air in high velocity systems, available in a range of sizes and types for overhead or perimeter air distribution in single or dual duct applications, will be featured.

AIR DISTRIBUTION PRODUCTS, 116 S. La Brea, Los Angeles 36, Calif. — Booth 209

In attendance: R. C. McCollom, Dave Rifkin, A. B. Beardsley.

Exhibiting: Ceiling diffusers and volume controls.

AIR DOOR INC., DIV. OF NEW CASTLE PRODUCTS, INC., 1711 "I" Ave., New Castle, Ind. — Booth N-210

In attendance: R. J. Piros, E. J. Kurek, D. E. Baldock, Jay W. Smith, H. D. Oberdorfer, R. W. Wittenbraker, D. C. Danielson, R. H. McConville, J. D. McIntyre, J. F. Quinn, Jr., H. D. Mastin, Jr., B. W. Merrill.

Exhibiting: Full scale cross-section of a complete, self-operating air door, demonstrating this method of protecting an entrance or opening against infiltration of dust, insects, foreign matter and weather, without the use of ordinary doors.

AIR-FACTORS, INC., 1624 S. Raymond, Monrovia, Calif. — Booth N-224

In attendance: Frank E. McDonald, and various representatives.

Exhibiting: Air diffusers, registers and grilles, volume controls, dampers and louvers. Air curtain diffusers and modular ceiling air diffuser will be featured.

AIRFLEX CORP., 522 N. Hickory, Champaign, Ill. — Booth N-212

AIRFLOOR CO. OF CALIF., INC., 13729 E. Rosecrans Ave., Norwalk, Calif. — Booth N-316

In attendance: Carl Eugene Williams, Louis J. Leemhuis.

Exhibiting: Metal form work for warm air panel heating and air conditioning system.

AIR-MAZE CORP., 25000 Miles Rd., Cleveland 28, Ohio — Booth 550

In attendance: W. B. Watterson, F. P. Purvis, J. Clem, A. P. Dovola, N. L. Lamprecht, W. J. Decker.

Exhibiting: Electrostatic air filters, automatic curtain type air filters, air filter panels. Washable dry type air filter will be featured.

AIR MOVING AND CONDITIONING ASSOCIATION, INC., 2159 Guardian Bldg., Detroit 26, Mich. — Booths N-545, N-546

In attendance: Lewis O. Monroe, Robert E. O'Rourke.

Exhibiting: No products will be exhibited, but bulletins will be available for distribution, including a new one on "Prototype Fan Testing". Activities of AMCA will be explained.

AIR-PATH PRODUCTS CO., 4620 Doll Ave., Baltimore 15, Md. — Booth 320

In attendance: Robert A. Lucas, Allen Alt, Sr., Harry Dischinger, Stanley Wojick.

Exhibiting: Louvers, dampers, door grilles.

AIR & REFRIGERATION CORP., 439 Madison Ave., New York 22, N. Y. — Booth 41

In attendance: Walter L. Fleisher, Daniel C. Lindsay, Harry C. Jones, Joseph H. Burges, Joseph L. Blackshaw, Harvey S. Dutcher, Robert W. Gaines, Richard W. Burges.

Exhibiting: Articulated air conditioning unit, comprising controlled outside and return air mixture, filter bank, sprayed direct expansion coil unit and fan, with the refrigeration compressor, receiver and evaporative condenser also enclosed in the same housing.

AIRSERCO MFG. CO., INC., 435 Melwood St., Pittsburgh 13, Pa.—Booth 301

AIRTEMP DIV., CHRYSLER CORP., 1600 Webster St., Dayton 1, Ohio—Booths 12, 43

In attendance: Members of Chicago area field staff (headed by D. E. Parke, regional manager) will be in attendance. All Airtemp top officials will attend the exposition and be available at the firm's exhibit.

Exhibiting: Residential cooling and heating equipment, commercial air conditioning units, room and car air conditioners. Making their initial show appearance will be the 1957 "Dandy Dozen—plus One" room air conditioners. Shown also for the first time will be the new car air conditioning system, displayed in a Chrysler. New "3 hp" air cooled packaged home air conditioning unit will also be introduced.

AJAX BOILER & HEATER CO., 1519 W. 132nd St., Gardena, Calif.—Booth N-326

In attendance: Theodore Fulkerson, G. N. Laushkin, L. E. Donahue.

Exhibiting: Gas fired water heating boiler with copper tubes and metalized headers; oil fired steam boiler. Boiler with internal heat exchanger for hot water and steam installations will be featured.

ALCO VALVE CO., 865 Kingsland Ave., St. Louis 5, Mo.—Booth 1163

In attendance: J. E. Dube, C. B. Lockwood, G. J. Boepple, A. L. Baker, J. A. Schenck, T. J. Phillips, R. N. Meyer.

Exhibiting: Refrigeration controls, including thermostatic expansion valves, "Venturi-Flo" distributors, solenoid valves, pressure regulators, reversing valves for heat pump operation.

ALDRICH CO., Wyoming, Ill.—Booth 1051

In attendance: P. M. Stephenson, N. Howard, B. Mulder.

Exhibiting: "Heat-Pak" series "C" ("Gulf Stream") and series "D" low pressure steel heating and hot water supply boiler-burner units (oil fired and gas fired); high pressure conversion oil burners with range of 0.75 to 19.90 gph. Availability of boiler-burner units for diversified heating needs will be featured. The same basic boiler-burner units are available as galvanized, high delivery, integral, compact hot water heaters with outputs from 115 to 950 gph, 100 F rise.

ALLEN-BRADLEY CO., 136 W. Greenfield Ave., Milwaukee 4, Wis.—Booths 556, 558, 560

In attendance: D. L. Anderson, James N. Farley, K. E. Gorder, Leon Murray, H. Rosenkranz, C. T. Roy, Robert F. Schmid, L. E. Stieghorst, Richard Wessling, J. K. McKnight, J. W. Clagett, Willett C. Kubec.

Exhibiting: Manual and magnetic motor starters for full voltage and reduced voltage starting; pilot devices and accessories, including pressure switches, temperature switches, float switches, control relays, push buttons, etc. Standard duty push buttons with contact mechanism in the cover to speed up installation and maintenance, and domestic pressure controls of new compact design with handy snap-off cover, will be featured.

ALLIED CHEMICAL & DYE CORP.—see GENERAL CHEMICAL DIV.

ALLIED THERMAL CORP.—see TUTTLE & BAILEY DIV.

ALLIS-CHALMERS MFG. CO., P. O. Box 512, Milwaukee 1, Wisc.—Booth N-315

In attendance: W. L. Manly, J. C. Collier, S. E. Bovim, S. S. Brooks, C. F. Freund, A. H. Kaneen, K. V. Knudsen, G. H. Krohn, W. F. Sickels, B. E. Southard, E. F. Griewe, R. N. Brown.

Exhibiting: Pumps, motors, control, and "Texrope" V-belt drive equipment.

ALLIS CO., THE LOUIS, 427 E. Stewart, Milwaukee 1, Wisc.—Booth N-305

In attendance: W. E. Barta, F. G. Luber, W. F. Schrieber.

Exhibiting: Motors designed for the heating and air conditioning industry.

AMERICAN AIR FILTER CO., INC., 215 Central Ave., Louisville 8, Ky.—Booths 38, 40

In attendance: Robert W. Nelson, John W. Frazier, Richard W. Smith, Irving W. Clark, Frank T. Carroll, Frank E. O'Callaghan, W. J. Killian, Charles S. Stock, C. A. Pickett, Robert J. Walker, Dale Barnstable, Robert Whyte, Earl Evans, Thomas R. Chambers, Arthur Nutting, John Hellstrom, W. G. Frank, Jack W. O'Neil, Robert D. Moore, Edward C. Arenz, Frank Delph, H. J. Noles, C. D. Wright, R. G. Pate, A. T. Miller, H. H. Bishop, John M. Kane, E. W. Currier, W. B. Bateman, Ralph W. Arboe, John J. Willis, Howard M. Fitch, A. F. Hubbard, John Ehretsman, Richard Leutwiler, Paul Hultgren, Glen Snagel, Gordon Baustain, W. G. Hole, F. Mallozzi.

Exhibiting: "Roll-O-Matic" air filter, "Electro-Cell" electronic air filter, "Multi-Duty" air filter, "Multi-Pak" air filter, "PL-24" air filter, special air filter, "Roll-O-Mat" filtering media, "Amerglas" disposable air filters, "Electro-Klean" electronic furnace filter, air conditioning unit ventilator, "Roll-O-Vent" heating and ventilating unit, radiator valves, thermostatic traps, float and thermostatic traps, "Select-O-Therm" high vacuum control systems, power specialties, strainers, heat exchangers, condensation pumps, convectors, zone control systems, console heater, unit blowers, unit ventilator, accessories. "Roll-O-Vent" heating and ventilating unit, "Roll-O-Matic" air filter, "Multi-Pak" air filter, and "Electro-Klean" electronic furnace filter will be featured.

AMERICAN ARTISAN, 6 N. Michigan Ave., Chicago 2, Ill.—Booth 924

In attendance: Charles E. Price, Wallace J. Osborn, Robert A. Jack, C. M. Burnam, Jr., Clyde M. Barnes, John H. Reock, George C. Cutler, Thomas V. Johnson, David V. Mahan, Robert J. Osborn.

Exhibiting: American Artisan magazine, technical books, market information.

AMERICAN BLOWER—DIV. OF AMERICAN-STANDARD, 8111 Tireman Ave., Dearborn, Mich.—Booths 22, 26

In attendance: Chicago district office personnel.

Exhibiting: Commercial packaged air conditioners, "Gyrol" fluid drive, refrigerating machine, high pressure fan, unit heaters, propeller fans, unit room conditioners, air conditioning unit components. 1957 line of commercial packaged air conditioners, low horsepower Class 2 fluid drive and a special illustrative display of the "Tonrac" single-stage hermetic centrifugal refrigerating machine will be featured, as will a special grouping of cabinet type air conditioning unit components and sub-assemblies, including a capillary section, a sprayed coil section and a fan section.

AMERICAN COILS CO., Newark, N. J., and Farmingdale, N. J.—Booths 346, 447

In attendance: Michael Parcaro, James Turner, George Mathews, Pete Hatcher, Louis Meringolo, John Kirk, Lawrence Jackiewicz, Joe Di Veglio, Bill Dinger, Thomas Krex, Howard Forman, John Hamilton, J. Konn, Frank S. Grott, Harry Bell, M. L. Judd, Rex Reece, H. W. McDowell, Harry Materne, Dan Mandery, M. J. De Angelo, O. O. Taylor, Robert Slater, A. Rocke, Wm. T. Cass, W. F. McLindon, L. McCauley, R. E. Vernon, Mr. Parmalee, Mr. Hull, George Rosner, Jack Wallice, Matt Sloat, M. R. Lederer.

Exhibiting: Air conditioners, 3-15 hp; heat pumps, 3-15 hp; air cooled chillers, 2-5 hp; packaged chillers, water cooled, 3-15 hp; cooling towers, 3-60 tons; air handling units; air cooled condensers. New twin circuit dual 10 and 15 hp packaged chillers; new style heat pump, water to air, 3-15 hp; air cooled condensers, 3, 5 and 7½ hp; and air handling units, 3-15 hp will be featured.

AMERICAN FOUNDRY & FURNACE CO., Washington & McClun Sts., Bloomington, Ill. — Booth 733

In attendance: Richard D. Long, E. J. Anselman, G. McQuown, Wm. J. Klingberg.

Exhibiting: Models of heating and ventilating equipment; "Affco" ventilating specialties, such as louvers, dampers, etc.

AMERICAN FURNACE CO., 1300 Hampton Ave., St. Louis 10, Mo.—Booth 814

In attendance: R. A. Cromwell, L. J. Koch, H. R. Mitchell, R. L. Archibald, Chas. Phillips, C. S. Franke, L. Gary.

Exhibiting: "Afco Base Blo," counterflow, horizontal warm air furnaces; "Comfortmaker" air cooled cooling equipment. Applications of air cooled cooling to existing or new installations of warm air heating systems and new line of "Comfortmaker" air conditioning units will be featured.

AMERICAN GILSONITE CO., 3537 Lee Rd., Cleveland 20, Ohio—Booth 1167

In attendance: John F. Williams, Ernest T. Smith, H. E. Knauper, L. C. Wooster.

Exhibiting: "Gilsulate" insulation for hot underground piping.

AMERICAN HYDROVAC, DIV. OF PITZ FOUNDRY INC., 290 Scholes St., Brooklyn 6, N. Y.—Booth 568

In attendance: Robert G. Pitz, Robert M. Pitz, John C. Pedersen, Raymond E. Miller.

Exhibiting: Condensate-vacuum heating pumps.

AMERICAN IRON AND STEEL INSTITUTE —see COMMITTEE ON STEEL PIPE RESEARCH

AMERICAN MACHINE AND METALS, INC. —see De BOTHEZAT FANS DIV.

AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS INC. 62 Worth St., New York 13, N. Y.—Booth 701

In attendance: E. R. Kaiser, C. M. Humphreys, R. G. Huebscher, L. F. Schutrum, W. F. Kerka, T. C. Min, W. F. Hopper, J. E. Loucks, A. V. Hutchinson, C. H. Flink, C. H. B. Hotchkiss, W. M. Vidulich, F. W. Hofmann.

Exhibiting: Highlights of the activities of the Society in the fields of basic and fundamental research, publications and services to the membership, profession and industry.

AMERICAN-STANDARD AIR CONDITIONING DIV., 40 W. 40th St., New York 18, N. Y.—Booth 23

In attendance: W. G. Senft, A. D. Sullivan, D. C. McClymont, J. J. Robbins, R. L. Herron, T. J. Bujewski, H. W. Klein, M. G. Nelson, J. P. Farrell, R. J. Berkshire.

Exhibiting: Winter, summer and year 'round residential air conditioning equipment, gas and oil fired; commercial package-type summer air conditioners. Six new air cooled units "designed to meet the requirements of the rapidly expanding market for waterless air conditioning systems," plus a new horizontal winter air conditioner, will be featured. They include a 5 hp outdoor condensing unit; year 'round units equipped for gas-fired heating; year 'round units equipped for oil-fired heating; a counterflow evaporator unit; a blower-equipped evaporator unit; and a new horizontal air-flow evaporator unit that replaces a previous design.

AMERICAN-STANDARD, KEWANEE BOILER DIV., 101 Franklin St., Kewanee, Ill.—Booth 27

In attendance: E. M. Palmer, W. B. Russell, H. W. McClure, G. C. Zang, J. J. Graham, L. W. Charlet, C. K. Ferguson, T. B. Mansfield, R. M. Turner, K. W. Waltz, J. M. Hartman, E. C. Thompson, E. E. Druin, P. E. Mutchler, Russell Astrouski, Bill Cummings, O. J. Roberts, P. J. Miler, Clyde Stovall, Thomas McGlenn, John C. Walter, R. E. Sjoberg, Carlton F. Olsen, W. E. Foskett, Roy E. Meilner, Edward W. Irwin, John T. McGuire, John Soutar.

Exhibiting: "Job-Built Square-Heat" type "R" boiler, "GW-1" gas-fired boiler-burner unit, low-set type "C" boiler, welded "Scottie Jr." gas-fired boiler-burner unit, welded "Scottie Jr." oil-fired boiler-burner unit. "Job-Built" boiler, a recently developed product designed for easy installation in existing boiler rooms and shipped to the job site in sections small enough to pass through the average size door, will be featured, as will all welded "Scottie Jr." boilers for oil or gas firing, completely packaged Scotch type boiler-burner units from 18 to 65 hp.

AMERICAN-STANDARD PLUMBING AND HEATING DIV., 40 W. 40th St., New York 18, N. Y.—Booth 20

Exhibiting: Gas-fired boilers, oil-fired boilers, baseboard heating, radiation, commercial systems and residential systems. New "Arcoleader" oil-fired boiler package; new "A-7" oil-fired boiler; new high pressure, single adjustment oil burner; new high capacity "Radiantrim"; new self-contained "Remotaire" air conditioning system; new residential "Remotaire" air conditioning system, will be featured.

AMERICAN-STANDARD—also see AMERICAN BLOWER

AMMERMAN CO., INC., 110 N. Second St., Minneapolis 1, Minn.—Booth 126

In attendance: C. L. Ammerman, E. A. Ammerman, T. L. Ammerman, R. T. Gadbois, C. E. Sparrow, Robert Van Nest.

Exhibiting: New "Airmpeler Loboy" power utility vent roof exhausters with backward or forward curved wheels enclosed in standard scroll housings. Change in outward appearance of utility vent set "to meet the need of modern building design" will be featured.

ANCHOR DIV., STRATTON & TERSTEGGE CO., P. O. Box 311, New Albany, Ind.—Booth 659

In attendance: J. L. Meagher, E. J. Fackler, J. K. Hammond, C. E. Gehlbach, R. J. Adams, Denton Tucker.

Exhibiting: Furnaces, gas and oil; air conditioners, remote high side, air cooled; boilers, gas and oil, steam and hot water; conversion shell head oil burner; conversion gas burners; stokers.

ANDERSON CO., V. D., THE, DIV. OF INTERNATIONAL BASIC ECONOMY CORP., 1935 W. 96th St., Cleveland 2, Ohio—Booth 747

In attendance: Wm. J. Gleason, Jr., W. P. Nevins, M. J. Toth, E. A. Broestl.

Exhibiting: Steam traps, air release valves, strainers, purifiers.

ANEMOSTAT CORP. OF AMERICA, 10 E. 39th St., New York 16, N. Y.—Booth 6

In attendance: W. F. Peters, W. Floyd Self, J. M. Kearney, A. R. Gilbert, F. B. Kurth, W. H. Neekamp, F. Honerkamp, G. R. Wallen, J. Mutoli, W. O. Huebner, W. A. Kurnik, R. F. Hayes.

Exhibiting: Conventional and high velocity air diffusers; "Anemotherm" air meters for direct reading temperature, velocity and static pressure.

ANSUL CHEMICAL CO., 1 Stanton St., Marinette, Wis.—Booth 315

In attendance: L. C. McKesson, George Vermilye, John Bopp, E. A. Beacham, E. M. Billings, Herb Dill, T. O. Lester, J. H. Jarrett, H. C. Higley, Brad Sebstad, Jim Bowman.

Exhibiting: Sulfur dioxide and methyl chloride refrigerants, refrigeration oil, "T-Flo" drier, "Dry-Eye" moisture indicator which indicates dangerous presence of too much moisture by changing color and when used in combination with "T-Flo" drier, "becomes complete moisture control system for refrigeration equipment."

ARKLON MFG. CO., P. O. Box 3501, Cleveland 18, Ohio — Booth N-333

ARMCO STEEL CORP., 703 Curtis St., Middletown, Ohio—Booth N-205

In attendance: Donald D. Evans, William H. Withey.

Exhibiting: "Aluminized" steel, "Zincgrip" and "Zincgrip-Paintgrip", stainless steel, cold rolled "Paintgrip." "Aluminized Steel Type 1", an aluminum coated cold rolled steel recently approved by AGA-ASA for use in heating elements of gas fired gravity and forced air central furnaces, gravity and fan type floor furnaces, gravity and fan type vented recessed heaters, unit heaters and gas fired duct furnaces at temperatures up to 1030 F (plus room temperature), an increase of 225 F over the old maximum permissible temperature, will be featured.

ARMSTRONG CORK CO., Liberty St., Lancaster, Pa.—Booth 136

In attendance: J. P. Sawyer, M. F. Kottmeier, H. R. Caswell, C. W. Gundlach, F. F. Hauser, D. R. Herb, J. B. Nelson, W. C. Ryckman, A. B. Condon.

Exhibiting: Job adaptability and installation techniques applicable to "Armaflex", a new flexible foamed plastic pipe insulation, a short program of booth demonstrations will illustrate recommended installation techniques for all types of pipe and tubing. Other products featured include "Armaglas" duct insulation and pipe covering materials, insulation adhesives and finishing materials, and "LT" cork covering and corkboard.

ARMSTRONG FURNACE CO., DIV. OF NATIONAL UNION ELECTRIC CORP., 851 W. Third Ave., Columbus 8, Ohio—Booths 302, 401, 402

In attendance: W. J. Olsen, George Zimbleman, Charles L. Brooks, Herb Hays, J. R. Swinehart, Ed. Clifford, J. R. MacDowell, Lou Burton, Farl Styx, J. R. Irwin, Don Thomson, G. M. Mahnensmith, T. J. Echternacht, Jim Buchwald, Carl Bryson, Charles Daugherty, Dan Calori, Al Shepard.

Exhibiting: Residential warm air heating equipment; coal, gas and oil furnaces; industrial gas or oil furnaces; residential air conditioners, air or water cooled, in 2, 3 and 5 ton capacities. New 1957 gas and oil lo-hi boy model furnace line with either direct or belt drive blower, and "Ceramiflex" refractory liner for oil furnace heat exchangers will be featured.

ARMSTRONG MACHINE WORKS, 874 Maple St., Three Rivers, Mich.—Booths 1158, 1160

In attendance: O. E. Ulrich, T. H. Rea, T. M. Reed, Charles Daugherty, T. H. Pass.

Exhibiting: Steam traps, air vents, pipe strainers, industrial and domestic humidifiers, heat controls for hot water heating systems. New large capacity domestic "Humid-I-Maker" for controlling relative humidity in hot water heated homes, as well as in steam and warm air heated homes," will be featured.

ARROW-HART & HEGEMAN ELECTRIC CO., THE, 103 Hawthorn St., Hartford 6, Conn.—Booth 339

AUER REGISTER CO., THE, 6600 Clement Ave., Cleveland 5, Ohio—Booth 758

In attendance: H. F. Curtis, A. H. Bechtel, E. F. Steffner, R. E. Brumbaugh, F. J. Butler, D. J. Ruisinger.

Exhibiting: Complete line of registers and grilles for the heating and air conditioning industry.

AURORA PUMP DIV., THE NEW YORK AIR BRAKE CO., 629 Loucks St., Aurora, Ill.—Booths 1155, 1159

Exhibiting: Close coupled and pedestal mount general purpose pumps, condensation return units, boiler feed pumps, circulating pumps, vacuum return systems.

AU-TEMP-CO CORP., DIV. OF HEAT-TIMER CORP., 657 Broadway, New York, N. Y.—Booths 336, 338

In attendance: Albert Fowler, Edward J. Zeitlin, Richard Lassar.

Exhibiting: Motorized valves, electronic controls, oil immersed motors.

AUTO-FLO CORP., 12085 Dixie St., Detroit 39, Mich.—Booth 421

In attendance: Harold Burke, James Miner, Robert Matzen, D. B. Sutherland, Don Mullen, Bernard Magiday, Harold Michelman, P. J. Halter, Victor Vogel, Joe Vogel, E. N. Tipton, Sidney Mizell, Howard A. Weller, Dean P. Rethmeier, Theodore L. Smith, E. J. Towle, Charles Yengst, Harold Goodwin, Alexandria McCall, Morris Chapman, B. L. Rushton, Milton Perlman.

Exhibiting: Automatic humidifier, standard model and king size model oil filters, oil filter cartridges, glass fiber evaporator plates.

AUTOMATIC DEVICES CO., INC., 714 Hillgrove Ave., Western Springs, Ill.—Booth 1032

In attendance: Henry T. Kucera, Robert G. Davis, Eugene Clary, W. W. Thompson, W. Gaskill.

Exhibiting: Automatic "Weather Re-set" time switch, "Weather-Chron" regulator, "Weather-Flo" adjustable indoor-outdoor controllers, newly redesigned "Weather-Man" regulator, outdoor controller for steam heating systems. "Weather-Chron" regulator, a time switch having an outdoor bulb to automatically change the time of switching action from the night thermostat to the day thermostat as outdoor temperatures change, automatically eliminating night set-back in very cold weather and stopping heat flow to the building in preselected high outdoor temperatures (65 F), will be featured.

AUTOMATIC HUMIDIFIER CO., 19th and Main Sts., Cedar Falls, Iowa—Booth 723

In attendance: J. Harold Galloway, Warren G. Seeley.

Exhibiting: "Vaporite" and "Thermo Drip" humidifiers for warm air furnaces.

AVCO—LYCOMING DIV.—see SPENCER HEATER.

AVERY FARM MACHINERY CO.—see HART HEAT DIV.

B-I-F INDUSTRIES, INC., 345 Harris Ave., Providence 1, R. I.—Booths 761, 763

In attendance: S. R. Amylon, F. W. Deutsch, E. R. Franklin, R. H. Glanville, G. H. Jewell, N. Ludman, F. P. Pfeffer, R. H. Poulsen, J. B. Sheehan, W. A. Smith, M. H. Strickland, T. V. Voegtli, T. R. Zatkovich.

Exhibiting: "Proportioneer" proportioning pump with "Vane Guide" check valves for adding compounds to boiler feed water to prevent corrosion and scale or for other general fluid proportioning; "Builders Shuntflo" meter for totalizing steam, air or gas flows, of in-line design for lines 4 in. or under, bypass design for lines 5 to 20 in., which can actuate remote secondary indicating/recording instruments or pace proportioning pumps introducing inhibitors, disinfectants, deodorants, etc., to air or gas streams; venturi insert nozzle, a differential producer for metering chilled or condenser water in air conditioning systems, which is mounted between pipe flanges with no drilling or tapping of pipe line necessary. New "Shuntflo" in-line meter for totalizing flow of steam, which is self-contained and self-operated requiring no electrical connections or mercury, and has an entirely new cooling chamber and concentric metering orifice design, will be featured, as will "Proportioneer" model 19130 for feeding concentrated chemicals such as concentrated sulphuric acid for cooling towers direct from shipping containers.

BACHARACH INDUSTRIAL INSTRUMENT Co., 7301 Penn Ave., Pittsburgh 8, Pa.—Booth 671

In attendance: R. Ulrich, J. A. Stein, J. W. Smith, J. V. Palmer.

Exhibiting: "Fyrite" combustion testing kits, "Tempscribe" temperature and operation recorders, "Florite" air velocity meters, "Monoxor" for carbon monoxide detection, gas pressure manometers, filter gages to signal when filters on heating and air conditioning systems need to be changed. Scoop type air velocity meters, temperature recorder for remote readings, "Tempoint" air circulation thermometer, and instrument for CO detection will be featured.

BALTIMORE AIRCOIL CO., INC., Baltimore 3, Md.—Booths 1009, 1011

In attendance: John Engalitcheff, Jr., Ray R. Forseille, W. E. Kahlert, Hugh B. Shepard, George E. Klein, T. F. Facius, L. W. Bookhultz.

Exhibiting: New 20 ton blow-through type evaporative condenser, new 20 ton draw-through type cooling tower. Universal evaporative condenser and cooling tower will be featured. Draw-through arrangement "requires minimum floor space, is generally used for indoor installations." Two pan sections are available, one for attaching ductwork to inlet, the other for minimum height requirements. Blow-through type arrangement "is generally used for outdoor installations although it can be used equally well indoors when the equipment room can be used as a plenum."

BARBER-COLMAN CO., 1300 Rock St., Rockford, Ill.—Booths 711, 715

In attendance: C. J. Braatz, E. A. Greenlee, C. P. Yates, H. H. Kieckhefer, and others.

Exhibiting: Control center, unit ventilator control system, electronic combustion safeguard equipment, electronic multipoint recorder, electronic bulb type indicating and recording thermometers, and all types of air distribution equipment, including high velocity equipment, ceiling diffuser, sidewall diffusers and accessories. Features of exhibit include modern control centers for heating and air conditioning systems; unit ventilator control system with new dual bulb thermostat for uniform control of discharge air temperatures; two new models of electronic combustion safeguard equipment; two models of electronic indicating and recording thermometers; and a new design of an electronic multipoint recorder.

BARBER MFG. CO., THE, GAS & OIL BURNER DIV., 1054 E. 134th St., Cleveland 10, Ohio—Booths N-335, N-337

In attendance: Hayden Thompson, Don Daniels, Don Wallace, Jim Williams, Tom Willson.

Exhibiting: Gas burners of various types for heating equipment and appliance manufacturers, including atmospheric inshot gas conversion burners, atmospheric upshot gas conversion burners, impinged jet gas conversion burners. New power gas burners with Btu input from 50,000 to 200,000, incorporating "new principle of gas-air mixture to produce intensely hot gas flame in a confined area" will be featured.

BARNEBEY-CHENEY CO., Cassady and Eighth Ave., Columbus 19, Ohio — Booth 1046

In attendance: H. L. Barnebey, T. Barnebey, R. L. Trout, W. L. David, D. C. Hall, M. B. Chalfen.

Exhibiting: Activated charcoal air purification equipment — heavy duty "FilterFolds" for public buildings, offices, auditoriums, industrial plants, schools, and hospitals, and used in exhaust systems to prevent atmospheric pollution; self-contained purification units to circulate and purify the air in hospital rooms, restaurants, industrial plants, conference rooms, offices, and homes; new "Dacor" disposable type activated charcoal filter used in air conditioners, forced air furnaces, and ventilating systems. This will be the first showing of the new "Dacor" throw-away type activated charcoal filter at a national heating and air conditioning show.

BARRY BLOWER CO., 3100 California St., N. E. Minneapolis 18, Minn. — Booths 661, 663

In attendance: B. H. Barry, Allen Freidson, Herman Freidson.

Exhibiting: Forwardly curved blower wheels, housings and blowers; backward inclined blower wheels, housings and blowers; utility sets, forwardly curved; multiple forwardly curved blowers. New line of ventilating sets, direct drive and belt driven, and new line of backward inclined blowers will be featured.

BASTIAN-MORLEY CO., INC., 200 Truesdell Ave., LaPorte, Ind. — Booth N-415

In attendance: H. B. Carbon, F. G. Johnson, J. P. Hutchinson, H. J. Morley, R. E. Reynolds, J. Vitale, J. K. Clemens, J. Zylstra.

Exhibiting: Gas-fired boilers, water heaters, incinerators. New "Unipak" gas fired packaged boiler with controls and accessories factory assembled and wired, with net outputs of 72,000 and 99,000 Btu per hr will be featured.

BAYLEY BLOWER CO., 1817 S. 66th St., Milwaukee 14, Wisc. — Booth 227

In attendance: George E. Szekely, Frank J. Hamilton, Roger C. Olsen, B. M. Kluge, B. F. Mansion, Owen J. Willkomm, Francis J. Wuerl.

Exhibiting: Centrifugal fans, induced draft fan, air washer, blast coils.

BELL & GOSSETT CO., 8200 N. Austin Ave., Morton Grove, Ill. — Booths 1258, 1262, 1266

BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE CO., EVANSVILLE DIV., 950 E. Virginia St., Evansville, Ind.—Booth N-301.

In attendance: John R. Morrill, Donald J. Wood, Henry C. Preher, Hugh R. Dunbar, Dennis J. Miller, John W. Downen, William Cissell.

Exhibiting: Hermetic compressors.

BETT-MARR MFG. CO., 621 E. Excelsior Ave., Hopkins, Minn.—Booth 773

In attendance: R. L. Linquist, W. J. Conroy.

Exhibiting: Three wheel band saw, two wheel band saw, 24 in. cheek bender, 12 in. cheek bender. The new 24 in. cheek bender has a trunnion on the open end "to assure perfect bends along the entire length and also keep the bending bar in proper position at the starting point."

BETZ DIV.—see BOHN ALUMINUM & BRASS CORP.

BEVERLY SHEAR MFG. CO., THE, 3004 W. 111th St., Chicago 43, Ill.—Booth N-424

BINKS MFG. CO., 3100 Carroll Ave., Chicago 12, Ill.—Booth 1172

In attendance: C. R. Kranz, A. G. Stacy, Russell Plutz, James Doherty, Jack Miller.

Exhibiting: Cooling towers for business and industry.

BISHOP & BABCOCK MFG. CO., THE, 4901 Hamilton Ave., Cleveland 14, Ohio—Booth 132

In attendance: L. B. Smith, H. K. King, Sam Mullin, Jerry Bruckman, R. F. Doughty.

Exhibiting: Commercial fans and blowers.

BOHN ALUMINUM & BRASS CORP., BETZ DIV., Danville, Ill.—Booths N-225, N-227

In attendance: Frank C. Hawk, Robert L. Hodapp, Robert W. Carvell, Russell E. Keller, Charles B. Simison, David H. Gold, James F. Pierce, Donald J. Jessup, Charles E. McAdoo, David C. Williams, John W. Hudson, D. A. Bunner.

Exhibiting: Low temperature automatic defrost units, air cooled condensers, stud units—air conditioning, furnace bonnet units—air conditioning, finned coils.

BORG-WARNER CORP.—see INGERSOLL CONDITIONED AIR DIV., PRIMOR PRODUCTS DIV., and REFLECTAL CORP.

BOSTON MACHINE WORKS CO., 7 Willow St., Lynn, Mass.—Booth N-427

In attendance: Ralph L. Dennis, L. M. Nelson, H. C. Walters, Tony Torissi.

Exhibiting: "Apthorp True Alignment" nozzles, "Clearview" tank gages, "Boston" combustion head, "Instant-Glo" combustion chambers, chrome steel "Hang-Down" baffles, draft stabilizers, "Ideal" nozzle extractors, "Bosmaco-Apthorp" nozzle service kits, "Wigwam-Thermcaps," "Boston Breese" horizontal burners.

BRANDES CO., 2046 Winnebago, Madison 4, Wisc.—Booth 769

In attendance: E. E. Brandes, Fred Milverstedt, Carl Wetzel.

Exhibiting: Warm air baseboard. New diffuser in 2, 3, 4, 5, 6, and 8 ft lengths with adjustable end and top diffusion, "especially adaptable for cooling as throw and air pattern can be adjusted for air requirements of each room," will be featured.

BROOKSIDE CORP., McCordsville, Ind.—Booth 1069

In attendance: Claude A. Forth, Sr., Claude A. Forth, Jr., J. Wooden, Dorothy Hamm.

Exhibiting: Power roof exhausters.

BROWN PRODUCTS CORP., 97-12 Metropolitan Ave., Forest Hills, N. Y.—Booths 1020, 1022

In attendance: Jack Aronczyk, Frank Sieffert, Ch. Meehan, James Helminger, James McCarroll.

Exhibiting: Baseboard (copper tube, aluminum fins, ¾ in. and 1 in. tubing); finned tube (steel pipe, steel fins); packaged chillers; remote air conditioning units, chilled water systems. Chilled water systems offering automatic two-step cooling including chillers, room units and controls; baseboard using same enclosure used with ¾ in. and 1 in. elements to cut stocking problems; and complete line of steel and copper finned tube, will be featured.

BRUNDAGE CO., THE, 512 N. Park St., Kalamazoo 11, Mich.—Booth 615

In attendance: H. F. Brundage, F. W. Brundage, L. C. Kroes, W. A. Rockafield, E. N. Moncrief, G. A. C. Woolley, Jr., D. M. Johnston, Bruce McLouth, Lou Reining.

Exhibiting: Air conditioning and furnace blower line, featuring a performance demonstrator.

BRUNNER MFG. CO., 1821 Broad St., Utica 1, N. Y.—Booths 44, 139, 143

In attendance: A. G. Zumbrun, Sr., L. A. De Marsh, R. G. Albert, J. T. Yates, A. L. Haldeman, L. B. Menard, J. P. Junkin, Sr., J. P. Junkin, Jr., W. C. Roberts, and entire sales force.

Exhibiting: Refrigeration condensing units, both open type and semi-hermetic; refrigeration compressors, both open type and semi-hermetic.

BUENSOD-STACEY, INC., 45 W. 18th St., New York 11, N. Y.—Booth N-314

In attendance: Joe W. Kreuttner, A. C. Buensod, M. S. Smith, Norman Vaughn, Ernest Werder, Nicholas Shataloff, R. O. McGary.

Exhibiting: Dual duct air mixing units with automatic volume regulator and related specialties and accessories.

BUFFALO FORGE CO., 490 Broadway, Buffalo 4, N. Y.—Booth 937

In attendance: E. F. Wendt, W. R. Heath, F. B. Stubinger, C. C. Cheyney, J. W. Kipphut, R. C. Redmond, C. W. Lockhart, R. Farnham, W. R. Holt, J. E. Gill, R. D. Madison, R. P. Warren, P. B. Campbell, R. S. Lloyd, S. O. Johnson, E. P. Heckel, Jr., G. H. Johnson, R. Jorgensen.

Exhibiting: No. 890 "BLH" double fan, 30 in. "Sky Vent" power roof ventilators, 5 in. "SL" pump, "Shortboy", 21 in. vaneaxial fan, belted vent set, "BL" fan, "LL" fan, 3 in. pump, 2 in. pump, 16 in. spot cooler, 24 in., 16 in. and 12 in. "Breezo" fans, 12 in. penthouse, 24 in. belt air fan, unit heater, baby vent set, volume fan, exhauster fan. The No. 890 "BLH" double fan has a new design outlet and variable cantilever inlet vanes. The "V" and "H" "Sky Vent" power roof ventilators are suitable for high velocity and high capacity exhaust installations. The model H "Shortboy" exhibited is a new ventilating unit featuring tubular construction with hollow shaft and external bearings. The exhibit will feature a large simulated crate of room size in which will be exhibited a number of package type units. The crate theme is to emphasize the manufacturer's line of products which are stock items and ready for immediate delivery.

BUILDERS-PROVIDENCE, INC.—see B-I-F INDUSTRIES, INC.

BURGESS-MANNING CO., 5970 Northwest Highway, Chicago 31, Ill.—Booth 1040

In attendance: W. C. Kadow, J. Engberg, T. R. Partington.

Exhibiting: Radiant heating, cooling and acoustical ceilings.

BURNHAM CORP., 2 Main St., Irvington, N. Y.—Booths 837, 841

In attendance: V. A. Good, F. R. Brophy, John W. Murray, Jr., D. E. Hawk, J. Roy Knox, Geo. A. Langenberg, Wm. Enochs, John A. Harris, J. Robt. Collier, Glenn W. Hicks.

Exhibiting: "Base-Ray" cast iron radiant baseboards; "Pace-Pak" and "Holiday" packaged oil and gas boilers, respectively; "Pace-King" oil boiler; "Burnham" steel boilers.

BYERS CO., A. M., Pittsburgh, Pa.—Booth 755

CALGON CO., 323 Fourth Ave., Pittsburgh 22, Pa.—Booth N-339

In attendance: C. L. Barksdale, J. D. Crane, H. B. Kivlan, J. L. Connolly, R. D. Gumble, R. D. Baker, E. J. Mohney, W. R. Musser, D. R. Elms.

Exhibiting: "Calgon" scale remover, "Micromet" plates, algaecide, "Banox W. T.," corrosion inhibitor, boiler water treatment, "Micromet," "Micromet" feeders, "Zeotone." "Banox W.T.," corrosion inhibitor "MD," and boiler water treatment are new products which become available this month.

CALUMET & HECLA, INC.—see WOLVERINE TUBE

CAMBRIDGE FILTER CORP., 738 Erie Blvd. East, Syracuse 3, N. Y. — Booth 409

In attendance: David N. Northrup, William W. Baldwin, Paul M. Engle, Robert L. Stoffregen.

Exhibiting: "Absolute" and "Aerosolve" air filters.

CARNES CORP., Verona, Wisc.—Booth 407

In attendance: W. R. Carnes, F. A. Freese, P. L. Engler, G. S. Sylvester, R. L. Whiting, Ed Westbury, F. C. Cameron.

Exhibiting: Power roof ventilators, side wall exhausters, ceiling diffusers, registers and grilles. New line of belt driven centrifugal ventilators, sizes 7 in. through 48 in., and new diffuser adjustable for direction of air patterns on a horizontal plane, will be featured.

CARRIER CORP., 300 S. Geddes St., Syracuse 1, N. Y.—Booths 515, 517, 519

In attendance: Charles Fenn, Hermann Hoffmann, Maurice Wilson, Victor Cole, Vincent Day, Robert White, Gordon Dinger, Howard Finck, Owen Kuhen, Edward Dafter, Al Giannini, Jack White, R. Phillips, R. S. Fullerton, G. Fruechtenicht, Donald Ryan, J. E. Salmon, L. J. Krantz, G. D. Harbin, C. V. Perna, Ted Skoglund, Ken Vaughn, Mike Kane, William Hillen, Pierce Burke, Jack Voigt, A. E. Meling, William Lake, Robert Allen, George Robinson, William Egan, George Long.

Exhibiting: Residential, commercial, and industrial air conditioning equipment and systems; ice making equipment; refrigeration equipment.

CARVER PUMP CO., Muscatine, Iowa—Booth N-246

CENTURY ELECTRIC CO., 1806 Pine St., St. Louis 3, Mo.—Booth 855

In attendance: G. C. Henderson, W. C. Wetlaufer, A. F. Gerecke, Geo. Smith, Wm. D. Helm, P. F. Williams, R. L. Biller, W. Seneff, L. H. Downing, C. F. Luchsinger, V. G. Cox, Frank E. Nutt, H. McInerney, Geo. Nafe, Jack Bain, Fred Powers.

Exhibiting: New "Industrial Quality" 48 frame motor line, including cutaway models and an up-to-date bulletin covering complete fractional horsepower motor line; permanent split capacitor motor line as applied to the heating and air conditioning fields; special exhibit unit containing a re-rated integral horsepower motor; demonstration unit showing the way manufacturer's permanent split capacitor motors are designed. Demonstrations of the usage of the motors that are employed in the heating and air conditioning field, especially informative from a designer's point of view, and a demonstration of part winding increment start, will be featured.

CENTURY ENGINEERING CORP., 401 Third St., S.E., Cedar Rapids, Iowa—Booths 825, 829

In attendance: W. S. Moellering, E. W. Johnson, J. Stites, H. C. Sparks, R. F. Considine, Kenneth Gray, B. J. Lattner, Chas. Walker, W. D. Olive, E. J. Mettelka, J. S. Davis, Thos. Donahue.

Exhibiting: Gas furnaces, oil furnaces, air conditioners.

CHACE CO., W. M., 1600 Beard Ave., Detroit 9, Mich.—Booth 1072

CHAMPION BLOWER & FORGE CO., Lancaster, Pa.—Booths 1166, 1168

In attendance: Henry K. Long, William M. Gelvin, Paul K. Martzall, Kenneth M. Peters.

Exhibiting: Fans, blowers, exhausters, "Champion-Haveg" acid-resisting exhauster, suitable "for high concentrations of most acids and reasonably high temperature," will be featured.

CHAR-GALE MFG. CO., Anoka, Minn.—Booth 873

In attendance: C. L. Johnston, N. J. Dovolis, D. E. Johnston, George Standen, Harley Sipprell, George Sprick, George Chenoweth, Jess Bratsch, Joe LaTuff.

Exhibiting: Baseboard and ceiling air diffusers, aluminum and galvanized ducts and fittings, humidifiers, conventional and air conditioning registers, rain goods.

CHELSEA PRODUCTS, INC.—see POWER-LINE FAN CO.

CHEMICAL SOLVENT CO., INC., P. O. Box 487, Birmingham, Ala.—Booth 313

In attendance: Noel A. Burkey, Jr., Olivia P. Burkey, Wm. J. McKeough, Walter E. Evans, Jr., Rudy Wolfe.

Exhibiting: "Solvex" line for cleaning and protecting water cooled refrigeration and air conditioning equipment and wet heating. New 10 lb container for "Ultra Solvex," emphasizing its use to clean heavily scaled water cooled refrigeration and air conditioning systems, and for cleaning boilers and opening sluggish drain lines and hot water systems, will be featured.

CHICAGO BLOWER CORP., 9867 Pacific Ave., Franklin Park, Ill.—Booths 602, 703

CHICAGO PUMP CO., 622 Diversey Parkway, Chicago 14, Ill.—Booth 30

CHICAGO SHOW PRINTING CO., MYSTIK ADHESIVE PRODUCTS DIV., 2635 N. Kildare Ave., Chicago 39, Ill.—Booth N-342

CHRYSLER CORP.—see AIRTEMP DIV.

CLARAGE FAN CO., Kalamazoo, Mich.—Booths 817, 821

In attendance: S. H. Downs, C. O. Fury, C. R. McConner, N. A. Melzer, R. A. Wasson.

Exhibiting: "Centrilator", new centrifugal type power roof ventilator in operation; fan section and spray section of "Hi-Static Multitherm" unit; ventilation unit (ready to run); "Tru-Sight" remote oiler; "Time NH" ventilating fan. The new centrifugal power roof ventilator with an exclusive "Jet Siphon" feature, said to be uniquely suited to high static pressure requirements; the new "Hi-Static Multitherm" unit designed principally for high velocity conduit air conditioning systems in multi-story buildings; and the new remote oiling device for fan bearings will be featured.

CLAYTON & LAMBERT MFG. CO., 1701 Dixie Hy., Louisville 10, Ky—Booth 443

In attendance: Roger Sherwood, Jim Francis, Mal Driever, Brad Tyrrell.

Exhibiting: "Lamneck" prefabricated air distribution pipe and fittings, "Alumilux" water heaters, "C & L" hand torches for LP gas. Four new design fittings and connectors for simplified ductwork installation in remodeling market will be featured.

CLEAVER-BROOKS CO., 326 E. Keefe Ave., Milwaukee 12, Wisc. — Boiler Div., Booths 648, 650. Burner Div., Booth 331

In attendance: Boiler Div.—J. C. Cleaver, R. E. Brooks, H. F. Holtz, F. E. Hainer, W. F. Zunker, W. F. Stoehr, K. K. Hilgendorf. Burner Div. — J. V. Resek, Wm. DeMuth, H. McCoy, H. Fitzpatrick, J. Will.

Exhibiting: "CB 125" 150 hp package boiler, "P 40 Progress" commercial heating package boiler, available in five sizes, the boiler being a complete package.

CLEVELAND HEATER CO.—see AIR CONTROLS, INC., DIV.

CLEVELAND STEEL PRODUCTS CORP.—see TORIDHEET DIV.

COBRA METAL HOSE DIV., DK MFG. CO., 4640 W. 54th St., Chicago 32, Ill.—Booth 232

In attendance: Paul Firring, Herbert N. Woodward, Victor Sipovic, Clyde D. Greeno, Tom Quinn.

Exhibiting: Complete new line of flexible metal hose connectors—"Flexnipples," "Flexpipe," and flexible hose assemblies. Pressure hose assemblies used on guided missiles, jet engines and other high pressure applications, and a new liquid oxygen transfer hose will be shown. Buying hose in completed assemblies identified with catalog numbers and individually priced will be featured.

COLEMAN CO., INC., THE, 250 N. St. Francis, Wichita 1, Kans.—Booths 236, 238, 242

In attendance: Leland Ginn, Marshall Fryar, Ed G. Johnson, A. M. Castello, H. W. Morton, A. B. Newton, R. G. Rankin, M. G. Raake.

Exhibiting: Gas water heaters, oil and gas floor furnaces, gas wall heaters, oil furnace (vertical), "Air-Mist" remote air conditioning package, upright and plenum cooling units, air cooled condenser. New "Polar-Pak" air cooled, self-contained central air conditioner; "Trim-Boy" gas fired furnaces (both horizontal and vertical models); and "Vit-Rock" gas water heaters will be featured.

COLUMBIA BURNER CO., 729 Ewing St., Toledo 7, Ohio—Booth 1259

In attendance: Arnold A. Muenzer, Joseph F. Capoun.

Exhibiting: Gas and oil furnaces, air conditioning, gas conversion burners.

COMBUSTION CONTROL DIV., ELECTRONICS CORP. OF AMERICA, 77 Broadway, Cambridge 42, Mass.—Booth 1238

In attendance: L. D. Sibley, P. K. Ryder, J. G. A. Mitchell, W. S. Tallon, E. F. Hall, H. Christiansen, H. M. Ebert, T. Moberley, V. Kuellmer.

Exhibiting: New "Fireye" panel control systems for automatic burners and new "Fireye" safety interlock systems for semi-automatic and manual burners. Controls for burning fuel safely "to protect life and property from the hazard of flame failure explosion, whenever fuel is burned for power, process, or heating," will be featured.

COMMERCIAL FILTERS CORP., 2 Main St., Melrose, Mass.—Booths 1124, 1126

In attendance: H. A. Wilson, P. R. Matravers, J. R. Chisholm, R. L. Fielding, Jack Berg, R. Olson, H. L. McNally.

Exhibiting: "Fulflo" oil burner filter; "Honeycomb" filter tubes—refill elements for "Fulflo" filters. Large filters for tank trucks and truck loading platforms will be featured.

COMMERCIAL REFRIGERATION & AIR CONDITIONING, 812 Huron Rd., Cleveland 15, Ohio—Booth 741

Exhibiting: Publication.

COMMITTEE ON STEEL PIPE RESEARCH, AMERICAN IRON AND STEEL INSTITUTE, 150 E. 42nd St., New York 17, N. Y. —Booth 1006

In attendance: G. D. Lain, research engineer for the Committee, and assigned representatives of sponsors.

Exhibiting: The display will illustrate some of the uses of steel pipe.

CONCO ENGINEERING WORKS, HEATING & AIR CONDITIONING DIV., Mendota, Ill.—Booth 1214

In attendance: J. W. Burch, J. T. Wells, H. C. Galleher, Phil Abele, A. K. Boone, R. W. Corbett, O. Henry, J. A. Howarth, Wm. Momeny, L. A. Page, E. A. Phillips.

Exhibiting: Residential heating and air conditioning units, with special attention given to new 110,000 Btu output low-boy furnace and new "Modulux" unit, which employs face and bypass dampers for residential application in both heating and summer air conditioning.

CONDENSATION ENGINEERING CORP., 3511 W. Potomac Ave., Chicago 51, Ill.—Booth 221

In attendance: B. A. Johnson, Wayne Limbert, Bill Newton, Blake St. Clair, Otto Zeman, Walt Aschliman, Tom Jones, Bob Wasson.

Exhibiting: "Vitroliner" prefabricated chimneys and chimney lining pipe.

CONKEY & CO., H. D.—see FIELD CONTROL DIV.

CONNOR ENGINEERING CORP., Shelter Rock Lane, Danbury, Conn. — Booth 142

In attendance: Henry A. Baker, Peter Arcentieri, Harold H. Todd, Jr., Henry J. Couch, Philip Terrill.

Exhibiting: Complete lines of commercial round and square type diffusers, high pressure diffusers and equipment, "Dorex" air improver equipment, residential "Kno-Draft" diffusers.

CONTINENTAL AIR FILTERS, INC., P. O. Box 1647 (2520 Helm St.), Louisville 1, Ky. Booth 1133

In attendance: Wm. K. Gregory, John A. Taylor, Frank B. Johnston, Sidney S. Emison, L. P. Bryant, Robert Hoover, R. A. Durham, Willis Veirs, Arthur Klein, F. A. McVeety, Robert Snider.

Exhibiting: Air filters.

CONTRACTOR, THE, Grand Central Terminal Bldg., New York 17, N. Y.—Booth 1227

Exhibiting: Publication.

CONTROLS CORP. OF AMERICA—see A-P CONTROLS DIV. and MILWAUKEE VALVE CO.

COOK CO., LOREN, THE, 227 Depot St., Berea, Ohio—Booth 112

In attendance: Loren Cook, Robert E. Parshall, Emil Rudy, Fred W. Starn, Thomas B. McKelvey.

Exhibiting: Spun aluminum roof and wall ventilator.

COPELAND REFRIGERATION CORP., Sidney, Ohio—Booths 1220, 1224

In attendance: Frank J. Gleason, W. G. Von Meyer, Rudy Berg, James Barker, A. E. Cadwell, Hugh Smart, F. E. Jernberg, T. J. Small, J. L. Zant, Bert Kaple.

Exhibiting: Condensing units, motor-compressors and compressors. New compact "Copelametic" and "Copelaweld" motor-compressors will be featured.

CORLEY CO., INC., THE, Plainville, Conn. —Booth 114

CORMARK DISTRIBUTORS, 5147 W. Diversey Ave., Chicago 9, Ill.—Booth N-217

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.—Booths 33, 37

In attendance: 72 heating experts.

Exhibiting: Complete line of hot water and warm air heating equipment, as well as air conditioning systems. Exhibit will also include a nation-wide weather map, overlaid on the manufacturer's distribution system, and a central lounge area. "Sunnyday" boilers for residential heating, guaranteed for 20 years, including No. 15 with new boiler jacket, will be among the products featured.

CRIBBEN & SEXTON CO., 700 N. Sacramento Blvd., Chicago 12, Ill.—Booth 138

CRISE CONTROLS DIV., ACRO MFG. CO., THE, 2040 E. Main St., Columbus 16, Ohio —Booth 1008

CURTIS MFG. CO., REFRIGERATION DIV., 1905 Kienlen Ave., St. Louis 20, Mo.—Booths 748, 750, 849, 851

In attendance: H. C. Morrison, H. J. Nettler, F. J. Hanley, K. T. Rockey, Wm. P. Moeller, R. J. Allen, W. Smallwood, A. M. Bono.

Exhibiting: Packaged air conditioners (1-6 ton size and 1-40 ton size); packaged water chillers (1-40 ton size); condensing unit (30 ton size); air cooled residential condensing units (5 and 7½ hp sizes). New packaged air conditioners from 20 through 50 hp, and 7½ hp air cooled condensing units, primarily for residential cooling, will be featured.

CUSTOM INDUSTRIES MFG., INC., 1406 Parkman Rd., Warren, Ohio—Booth N-237

In attendance: Norman H. Mullett, James Purdy.

Exhibiting: Upshot and inshot gas conversion burners.

CUTLER-HAMMER, INC., 315 N. 12th St., Milwaukee, Wisc.—Booth 740

In attendance: K. M. Nelson, B. M. Horter, Jr., J. S. Trudgeon, M. J. Schwab, R. W. Thomas, H. E. Johnson, B. H. Chamberlin, R. G. Martinson, D. C. McIntosh, E. L. Singler, G. I. Wolff, C. W. Greenman, P. L. Erickson, W. R. Hileman.

Exhibiting: Refrigeration control, magnetic starters, manual starters, safety switches, push-button stations and allied electrical equipment. "Roto-Push" and "Pres-Test" push-button units will be featured, the first combining functions of single button station with advantages of two or three position selector switch in one unit, and the second providing a simple means of checking indicating lights without disturbing control circuit or removing lens or bulb.

CYCLOTHERM DIV., NATIONAL-U.S. RADIATOR CORP., 157 E. 1st St., Oswego, N. Y.—Booth 551

DK MFG. CO.—see COBRA METAL HOSE DIV.

DAVIDSON FAN CO., 213 California St., Newton, Mass.—Booth 1116

In attendance: Edward F. Patterson, John F. Snow, Raymond E. Mabey, F. E. Coolidge.

Exhibiting: Roof fans.

DeBOTHEZAT FANS DIV., AMERICAN MACHINE AND METALS, INC., East Moline, Ill.—Booths 239, 243

In attendance: Alonzo M. Harp; R. Bouslough; R. L. Hull; and representatives—Augur, Jones & Green; Fred S. Bailey; E. J. Becker Co.; A. C. Beckert; Grant E. Beverly Co.; Bratton Sales Engineers; Warren Bruce & Co.; A. H. Burnap, Bushnell Machinery Co.; C & S. Equipment Co.; Paul A. Chapman & Associates; J. W. Cherry Co.; L. F. Church Co.; Coward-Eastman Co.; H. M. Curfman Co.; Deco Engineering Products; DeHaas & Mitchell; Douglas Engineering Co.; Engineering Products Co.; Flinn Engineering Co.; A. A. Gould & Co.; Hairston and Co.; James A. Harwell; Allan E. Hause Co.; Irving R. Kahn; Hubert Kaub & Co.; Lancaster, May & Co.; E. H. Langdon Co.; Loeffler-Greene Supply Co.; Marshall, Neil & Pauley, Inc.; Robert E. Mason Co.; Geo. R. Mellema Co.; H. W. McKenzie; Neff Engineering Co.; Paller Engineering Co.; J. M. Pettingell Associates; Sales Engineering Co., Inc.; Laurence Trant & Co.; Wallin Engineering Sales Co., Harry Wright, Jr.; Wright Engineering Co.; State Equipment Co.

Exhibiting: Centrifugal roof ventilators, "Power-Flow" roof ventilator, vertical discharge roof ventilator, "Bifurcators", induced draft "Bifurcator," fan wheels. Centrifugal roof ventilator, produced for the first time in 1956, "with low silhouette and profiled to complement modern architecture and building construction," will be featured. It is available in 10 sizes with capacities from 1500 through 33,000 cfm.

DELAVAN MFG. CO., 811 Fourth St., West Des Moines, Iowa—Booth 1217

In attendance: D. T. Morgenthaler, R. E. Keene, Fred Mulcahy, Wm. B. Spargur, Lee N. Beardsley, Wm. J. Thurston, A. K. Johnson, Leonard Janssen, William Hunsicker.

Exhibiting: Nozzles and accessories; nozzle tools; nozzle racks; industrial nozzles for air conditioning; nozzle boxes; adapters, strainers, filters; nozzle kits for servicemen. New "48" nozzle box and new informative literature for servicemen will be featured.

DELCO PRODUCTS DIV. OF GENERAL MOTORS CORP., 329 E. 1st St., Dayton 1, Ohio—Booth 1216

In attendance: J. R. Lakin, R. O. Dehlendorf, M. E. Rasper, C. L. Holverstott, B. E. Charlesworth, G. C. Rohling, R. K. Eley, D. K. Tippy, I. J. Towns, J. R. Perkins, G. C. Tillotson, C. R. Knowlton, C. B. Lee, J. F. Howe, R. C. Anderson, J. W. Brumley, G. B. Liszak, H. C. Woodsum, J. D. Hughes, J. F. Rutter, L. C. Bond, R. B. Edgar, L. H. Shue, W. J. Manker, W. M. Stockstill, K. E. Leighty, and others.

Exhibiting: Electric motors and controllers, including hermetic motors, single phase and polyphase; motors for direct and belt driven applications, including shaded pole, extended wind, permanent split capacitor, split phase, capacitor start, polyphase; relays, capacitors and controllers. Inside-outside motor will be featured.

DELTA HEATING CORP., Cole St. at Reading RR, Trenton 8, N. J.—Booth 950

DETROIT CONTROLS CORP., 5900 Trumbull Ave., Detroit 8, Mich.—Booths 21, 220

DIEHL MFG CO., Finderne Ave., Somerville, N. J.—Booth 433

In attendance: A. R. Booth, D. P. Griggs, E. Lindberg, Jr., F. A. Yates, J. E. Ryan, J. E. Ramsay, C. H. Smith.

Exhibiting: Ventilating and exhaust fans, electric motors.

DIELECTRIC PRODUCTS CO., INC., 125 Virginia Ave., Jersey City 5, N. J.—Booth 530

In attendance: Henry T. Carey, Phil Krueger, Leon F. DeNicola.

Exhibiting: Ignition electrode assemblies for domestic, industrial and commercial oil heating equipment; assemblies of special design for oil- and gas-fired boilers and ovens.

DI MACHINE CORP., 2711 W. Irving Park Rd., Chicago 18, Ill.—Booth N-332

In attendance: Wm. Diebel, F. B. Hermann.

Exhibiting: "Diebel" automatic fin presses and fin dies, installation photographs and fin samples.

DODGE CORP., F. W., 119 W. 40th St., New York 18, N. Y.—Booth 201

Exhibiting: Reports on new construction for use in selling; publication.

DOERR ELECTRIC CORP., Cedarburg, Wisc. —Booth 561

In attendance: J. H. Park, G. L. Kunick, L. A. Doerr, Emmett Doerr, H. E. Ellis, W. F. Boerger, Karl Blind.

Exhibiting: Motors of both standard and special designs for use on pumps and other equipment associated with the air conditioning, heating and ventilating fields.

DOLE REFRIGERATING CO., 5910 N. Pulaski Rd., Chicago 31, Ill.—Booth 233

In attendance: A. B. Brady, H. W. DeBaugh, L. E. Gustafson, C. B. Leonhardt, C. J. Tesar, B. P. Tweed, H. P. Hansen, W. C. Mueller, O. L. Rose, J. E. Hutchinson, W. E. Lauterbach.

Exhibiting: "Ice-Cels" (latent heat ice storage systems for air conditioning). Chilled water air conditioning systems for churches, theaters, mortuaries, tourist courts or other applications that have a peak load for a short duration will be featured.

DOLE VALVE CO., THE, 1933 Carroll Ave., Chicago 12, Ill.—Booths 725, 727

In attendance: Will Pennington, Henry Aronson, William Wallin, Stuart Phillips, J. F. Lund.

Exhibiting: Air valves, vacuum valves, flow controls, relief valves, automatic warm air registers, shower controls, water mixers, chamber vents, faucet controls, flush tank fillers, "Salesmakers" display panel. Water mixer, relief valve, "Salesmaker" and shower control will be featured.

DOMESTIC ENGINEERING, 1801 Prairie Ave., Chicago 16, Ill.—Booths 518, 520

Exhibiting: Publication.

DONGAN ELECTRIC MFG. CO., 2987 Franklin St., Detroit 7, Mich.—Booth N-408

In attendance: Charles E. Hicks, Lawrence P. Murphy, James B. Evans.

Exhibiting: Replacement ignition transformers for industrial and domestic oil burners for servicing more than 2000 different models of burners with 10 basic transformers and 23 interchangeable mounting plates. New series of "buck and boost" transformers, designed to increase voltages from under-voltage circuits to normal, will be announced. The same transformer will also reduce (buck) line voltage by the same percentage.

DOVER MFG. CO., 3117 Weatherford Ave., Independence, Mo.—Booth N-343

In attendance: J. F. Pritchard, Jr., J. T. Reed, Jr.

Exhibiting: Natural and mechanical draft water cooling towers.

DOWNING STEEL PRODUCTS CO., 2305 S. Smithville Rd., Dayton 10, Ohio—Booth N-436

In attendance: J. M. Downing, Louis Thie.

Exhibiting: "Super-Jet" gas conversion burner.

DOYLE VACUUM CLEANER CO., 225 Stevens St., S.W., Grand Rapids 2, Mich.—Booth 739

In attendance: Clifford Kennedy, Walter B. Fitzgerald, Jack Fox.

Exhibiting: Vacuum cleaners and attachments.

DRAVO CORP., Dravo Bldg., Pittsburgh 22, Pa.—Booths 867, 869

DRAYER-HANSON DIV., NATIONAL-U.S. RADIATOR CORP., 3301 Medford St., Los Angeles 63, Calif.—Booth 811

DREIS & KRUMP MFG. CO., 7400 S. Loomis Blvd.; Chicago 36, Ill.—Booth N-417

In attendance: John H. Byrnes, A. J. DeWolf, Frank McNerney, Dick Johnson, Nick Gron, Birger Borgerson, Vinc. A. Bellick, Albert Muranko, Bert Guinee.

Exhibiting: Samples of press brake dies and photos and parts to show the applications of "Chicago" press brakes to the forming and bending of sheet metal used in heating and air conditioning systems, units, and items.

DRYER ELECTRIC CORP., 111 Bedford Ave., Brooklyn 11, N. Y. — Booth 566

DRYOMATIC CORP., 806 N. Fairfax St., Alexandria, Va.—Booth 208

In attendanee: Anthony Hass, Walter W. Bolton, Kirk L. Burns, David L. Watson, Norman L. Pearson, Ray Young, C. David Grinnell.

Exhibiting: Dehumidifiers and humidity control systems. Model 105 space dehumidifier for building volumes up to 35,000 cu ft will be shown for the first time.

DUNHAM-BUSH, INC., 179 South St., West Hartford 10, Conn.—Booths 910, 1244, 1248, 1250

In attendance: C. Boling, J. A. Mulcahey, W. S. Browning, R. B. Lennox, C. T. Cavanaugh, G. J. Finck, J. K. Campbell, C. W. Gaebel, A. A. Lincoln, D. W. O'Brient, O. M. Butler, D. G. Zakoian, E. L. Disbrow, J. F. Wasson, H. J. Bolhouse, A. R. Kaminsky, J. G. Herrmann, N. F. Sorgenfrei, J. S. Gregory, J. Mayor, A. S. Decker, E. M. Flannery, A. E. Keeler, E. Wertz, L. Foster, R. Frier, D. B. Stockdale, R. E. Sweeney, D. M. Fairbairn, C. Silva, A. J. Hesmer, C. P. Finke, R. M. Mitchell, M. McLacklin, L. Smith, A. J. Dickey, A. R. Treveiler, P. R. Schaffer, G. A. Mansinger.

Exhibiting: Air conditioning units and equipment; heating controls, systems, and units; water chillers and heat interchangers for air conditioning units. New "CR-Conditioners" heating and cooling units for hotels, apartments, and residences; and new small residential package chillers for cooling water in residential air conditioning systems, will be featured.

du PONT de NEMOURS & CO., INC., E. I., Wilmington 98, Dela.—Booth N-242

In attendance: J. C. Hoopes, N. W. Kent, S. R. Richardson, J. O. Wright, Jr., F. H. Fryer, W. H. Brown, Jr., D. C. McSorley, F. J. Steigerwald.

Exhibiting: "Freon" fluorinated hydrocarbon refrigerants.

DURANT INSULATED PIPE CO., P. O. Box 88, Palo Alto, Calif.—Booth 234

In attendance: William H. Buck, Anthony Oswald, Roger Clawson.

Exhibiting: Prefabricated, insulated pipe.

DURO DYNE CORP., 800 Third Ave., New Hyde Park, N. Y.—Booths 540, 542

In attendance: Martin M. Gracer, Milton Hinden, Arthur K. Marshall.

Exhibiting: "Duro Blade" kit, "Duro Metal Fab", "Duro Vane" rail, damper regulators and quadrants, "Greyhound" portable spot welder, metal punch machines, "Shur-Grip" file and solder iron handles, "Junior" flexible connector and insulation adhesive will be featured.

DWYER MFG. CO., F. W., P. O. Box 373, Michigan City, Ind.—Booth 1010

In attendance: J. G. Dwyer, F. W. Dwyer.

Exhibiting: Draft gages, manometers, pitot tubes, air velocity meters, air filter gages, combustion test sets.

ECKHART MFG. CO., INC., 931 Lehigh Ave., Union, N. J.—Booth 637

In attendance: Arnold Eckhart, Sr., Arnold Eckhart, Jr., Walter F. Eckhart, Geo. Lill, Fred W. Norman, Owen Rebbie, Harold Wolf.

Exhibiting: Complete line of "Korth" oil burners and featuring new improved "Shell Head" oil burners in capacities 0.75 to 1.65 gph and 1.65 to 3.0 gph.

EDDINGTON METAL SPECIALTY CO., Bristol Pike, Eddington, Pa.—Booths 1028, 1030

In attendance: Stanley Czarnecki, Walter V. Czarnecki, Casimer M. Czarnecki, Wesley Czarnecki, Charles B. Wells, Stanley Czarnecki, Jr.

Exhibiting: Nozzles, filters, stabilizers, combustion heads, air cones, strainers, inspection mirrors, servicemen's kits, pressure regulating valves. Condensate disposal pumps will be featured.

EDWARDS ENGINEERING CORP., 101 Alexander Ave., Pompton Plains, N. J.—Booth 966

EJAY BASEBOARD MFG. CO., 124 Boyd St., Winsted, Conn.—Booth 972

In attendance: Edward J. Fitzgerald, Hope S. Fitzgerald.

Exhibiting: "Ejay" baseboard heating systems and remote heating and cooling unit. New combination heating and cooling unit will be introduced.

ELECTRIC BOAT DIV., OF GENERAL DYNAMICS CORP., Groton, Conn.—Booth 309

ELECTRIC HEAT & AIR CONDITIONING, 2 W. 45th St., New York 36, N. Y.—Booth 948

Exhibiting: Publication.

ELECTRO-AIR CLEANER CO., 1285 Reedsdale St., Pittsburgh 33, Pa.—Booth 702

In attendance: P. W. Aitkenhead, R. C. Aitkenhead, D. J. Conroy, J. J. Deutsch, E. L. Baysek, Robert Ruhlman, W. F. McClintock, J. Woznichak.

Exhibiting: Electronic air cleaners and oil mist and smoke precipitators—"Compact Line" electrostatic air cleaning units; "Custom Line" unit; "Built-up Line" unit; single circuit display; black light display.

ELECTRO DYNAMIC DIV. OF GENERAL DYNAMICS CORP., 163 Avenue A, Bayonne, N. J.—Booth N-435

In attendance: Dean W. Paul, Wm. L. Pharmer, George Douglass, Zenon J. Raczkowski, Wm. Murphy.

Exhibiting: A-c electric motors from 1 to 300 hp, drip-proof; totally enclosed, fan cooled, and explosionproof motors. New improved rerated frames and large ribbed type construction explosionproof motors "for effective and efficient cooling" will be featured.

ELECTRONICS CORP. OF AMERICA—see **COMBUSTION CONTROL DIV.**

ELGEN MFG. CORP., 41-34 39th St., Long Island City 4, N. Y.—Booths 872, 874

In attendance: Louis Josephson, John J. Wyle, Morris Goldsmith, Fred Perlin, Bruno Speiser, Albert Josephson, Arthur J. Simpson.

Exhibiting: "Silent Duct" flexible duct connector, "Damperset" damper hardware, "All-tite" vane runner for turning vanes.

EMBASSY STEEL PRODUCTS, INC., 890 Stanley Ave., Brooklyn 8, N. Y.—Booth N-325

In attendance: A. J. Polakoff, Elliott S. Nelson, Irwin B. Nelson, Selwyn E. Farber, Sam Lane, Floyd Merryman, Bernard Socin, Dale Ravenscroft, Harry Barker, Larry Stafford, William Kittridge, Lewis Davidson, Robert C. Sweiger.

Exhibiting: Convectors, baseboard radiation, steel fin tube, steel boilers, combination air conditioning and heating surface for the heating and cooling industries. A combination convector and self contained air conditioner for providing air conditioning with wet heat in ½, ¾ and 1 ton capacities, the convector and element being manufactured by Embassy to fit the self contained air conditioner manufactured by others, will be featured.

EMERSON ELECTRIC MFG. CO., THE, 8100 Florissant Ave., St. Louis 21, Mo.—Booths 1261, 1263, 1265, 1267

EMPIRE CHEMICAL PRODUCTS CO., 10 Longworth St., Newark 2, N. J.—Booth 446

ENGEL SHEET METAL EQUIPMENT, INC., 8122 Reilly Ave., St. Louis 11, Mo.—Booths 101, 102

In attendance: C. F. Engel, Joseph R. Yoch, William Tanner, Louis Ranch, O. H. Wolters, Richard Taylor, Sherman Torkelson, Joe Pendino.

Exhibiting: "Duct Master," "Shopmaster," "Edge Master" flanger and open end flanger.

EQUIPCO, INC., 1238 N. W. Glisan St., Portland 9, Ore.—Booth N-235

In attendance: L. H. Nichols, L. H. Kurtz, G. L. Tandy.

Exhibiting: "Ascot" gas fired boiler, "Ascot" instantaneous water heater, "Thermorad" convector. The boiler, introduced during 1956, will be featured.

EUREKA WILLIAMS CORP., WILLIAMS DIV., 1201 E. Bell St., Bloomington, Ill.—Booths 330, 332, 334

In attendance: J. M. Gleason, C. G. Branch, T. H. Green, B. F. Mills, V. A. Krouse, H. C. Perry, W. R. Seeger.

Exhibiting: Oil and gas fired heating equipment and air conditioning units. New gas and oil units plus expanded air conditioning units will be featured.

EVANS CORP., GEORGE, THE, 121 37th St., Moline, Ill.—Booths 333, 335

In attendance: Frank L. Myers, Dick Evans, Howard C. Easter, William J. Henderson.

Exhibiting: "Litelong" air filter, "Litelong" grease filter, air filter frame of extruded aluminum.

EXCELSIOR STEEL FURNACE CO., THE, 546 W. Washington Blvd., Chicago 6, Ill.—Booth 631

In attendance: J. S. McDonald, Irving Brex, Robert Clement, C. M. Blodgett, C. R. Overley, Everett Brex, C. E. Owen, P. M. Crowley, Warren Schultz, Sam Berman, Everett Johnson, Elmer Jaroch, James Mangrum.

Exhibiting: Prefabricated air distribution pipe, ducts and fittings in snap lock and click lock types for heating and cooling installations.

FARR CO., P. O. 45187, Airport Station, Los Angeles 45, Calif.—Booth 506

In attendance: R. S. Farr, M. S. Farr, G. R. Holtz, F. X. Shea, F. A. Doody, H. Robson, F. Richardson, K. DeBaun.

Exhibiting: "Far-Air" filters, "Roll-Kleen" automatic dry type filter, after filter and high low velocity filter will be featured.

FASCO INDUSTRIES, INC., 255 N. Union St., Rochester 2, N. Y.—Booth 736.

In attendance: H. M. Sylvester, D. R. Schroedel, C. A. Button, J. M. Nolan, P. R. Reid, N. G. Polydoris, F. J. Dworetzky, W. A. MacDougall, R. E. Waffle, L. P. Doty, W. N. Agnew, P. M. Mock.

Exhibiting: Complete line of shaded pole and permanent split capacitor motors, two, four and six pole, rated 1/500 to 1/4 hp, centrifugal blowers rated from 15 to 275 cfm. Shaded pole motor, six pole, 5 9/16 in. diameter, maximum hp rating 1/4; shaded pole four pole motor, 4 7/16 in., diameter, maximum hp rating 1/16; and new small two pole motor will be featured.

FEDDERS-QUIGAN CORP., Trenton 7, N. J.—Booth 914

In attendance: T. L. Arnold, J. E. Woodworth, H. Boxer, N. Weinstein, J. P. Divizio.

Exhibiting: Hot water and steam radiation, unit heaters, remote heating and cooling units, self-contained cooling units. Two and three ton "Adaptomatic" air conditioner for installation in attic or basement with air cooled condenser will be featured.

FEDERAL BOILER CO., INC., Granite & West Sts., Midland Park, N. J.—Booth 11

In attendance: Raymond H. Bohr, Robert McTaggart, James H. Legg, Walter Gamble, Roy M. Rathe, Herb Klaw, Charles Lowrey, Charles Cavanagh, Geo. McGrath, W. Leetch, Paul Stack, Earl P. Long, Harold Enyeart.

Exhibiting: "FPK" and "VGF-A-PK" boilers and "FBC" baseboard.

FEE & MASON MFG. CO., INC., 21 Wyckoff Ave., Manasquan, N. J.—Booth 108

In attendance: Charles Friedel, Thomas W. Mason, Walter Schlamp, Harry L. Jonathan.

Exhibiting: Pipe suspension equipment and accessories, spring hangers.

FIELD CONTROL DIV. OF H. D. CONKEY & CO., Mendota, Ill.—Booth 554

In attendance: H. J. Potter, Henry Remsberg, C. W. Potter, E. A. Field, Ben Hochstatter, George Peterson, Wayne Davis, Fay Kinne, Paul Jett, Roy Johnson, Fred McGee, R. J. Milholland, W. F. Hirsch, John Sandberg, J. R. Starnes, Howard Waff, Ray Westlund, Theodore Smith, John Elder, Charles Elder, B. A. Johnson.

Exhibiting: Barometric draft controls and double acting gas controls. New industrial and commercial combination oil and gas controls will be featured.

FLEXIBLE TUBING CORP., Guilford, Conn.—Booth N-302

In attendance: Frederick K. Daggett, Howard W. James, Wesley L. Guiles, John R. Shrewsburg.

Exhibiting: "Thermaflex" flexible ducting designed, specifically for connections between main ducts and sound boxes and diffusers in both high and low pressure air conditioning systems, will be featured. "Flex-Vent" kits for outdoor venting of automatic clothes dryers, to overcome difficulties in air conditioning kitchens and utility rooms where moisture and heat producing appliances are used will also be shown.

FLEXONICS CORP., 1315 S. Third Ave., Maywood, Ill.—Booth 1107

In attendance: J. F. P. Farrar, T. K. Wells, E. L. Hiter, E. W. Driedger, F. J. Rupp, W. C. Gage, R. M. Quick, L. R. Taylor, L. J. Cullen, W. R. McDorman, I. H. Wallace, E. C. Langille.

Exhibiting: "Flexon" expansion joints, compensators, and flexible metal hose.

FLINTKOTE CO., THE — see VAN-PACKER CO.

FOOD MACHINERY AND CHEMICAL CORP., PEERLESS PUMP DIV., 2005 Northwestern Ave., Indianapolis, Ind.—Booth 1219

FOREST CITY FOUNDRIES CO., THE—see NIAGARA FURNACE DIV.

FRASER & JOHNSTON CO., 1900 17th St., San Francisco 3, Calif.—Booths N-226, N-228

In attendance: W. H. Johnston, G. H. Cardiff, E. A. Easton, I. S. Fairbanks, E. M. Brickey, L. Ramos, Ed. De Voe, Hal Bissel.

Exhibiting: Gas warm air furnaces "of all types for central heating and air conditioning," air cooled condensing units, matching evaporator assemblies to fit exhibitor's furnaces.

FREEMAN HEATING DIV. — see ILLINOIS IRON & BOLT CO.

FRICK CO., W. Main St., Waynesboro, Pa.—Booth 1017

In attendance: P. H. Buch, C. C. Smith, M. B. Watts, W. O. Kline, R. M. Shuford.

Exhibiting: Four cylinder "Eclipse" cut-away compressor, 7½ hp unit air conditioner, new ceiling-type evaporative condenser, models of spiral finned coil and "Prestfin" coil.

FRIGIDAIRE DIV., GENERAL MOTORS CORP., Dayton 1, Ohio—Booth 29

In attendance: B. C. Wagner, W. H. Winn, R. S. McCool, R. F. Johnson, H. F. Harter, and others.

Exhibiting: Low-boy oil furnace, vertical and horizontal oil furnaces, vertical and horizontal gas furnaces, low-boy gas furnace, reverse flow gas furnace mounted on a cooling coil, remote coil blower, air cooled condensing unit, "Master-matic" air conditioner, "Multimatic" air conditioner, horizontal cooling coil with simulated hook-up with a furnace, room air conditioners, and water cooler in operation for convenience of guests. One of the vertical gas furnaces will be displayed in a simulated hook-up with a condensing unit and cooling coil, with the blower operating. Another vertical gas furnace will be cut-away to show its construction and explain its operation.

FUELOIL & OIL HEAT, 2 W. 45th St., New York 36, N. Y.—Booth 948

Exhibiting: Publication.

FULTON SYLPHON DIV.—see ROBERTSHAW-FULTON CONTROLS CO.

FURNAS ELECTRIC CO., 1000 McKee St., Batavia, Ill.—Booth 231

In attendance: W. C. Furnas, W. F. Lisman, J. B. Blass, J. M. O'Rourke, C. F. Witschonke, E. A. Parmann, H. L. DeKeyser, L. B. Dungey, H. Bruno, R. E. Baur, F. H. Thiedig, G. Smardon, P. Geiger.

Exhibiting: Electric motor controls, including magnetic starters and contactors, pushbuttons, drum controllers, pressure switches and drum controllers, pressure switches and pilot devices. New air conditioning and refrigeration controls offering four control sizes, 20-30-35-50 amperes, with silver cadmium oxide contacts for long control life, magnets requiring less watts to reduce transformer sizes and thermostat contact load, and in which each pole carries full current so that poles are not connected in parallel, will be featured.

GALLAHER CO., THE, 4108 Dodge St., Omaha, Nebr.—Booth 317

In attendance: I. I. Solzman, George Linge, Fred Balzer, V. P. Hansen, R. E. Burden, R. D. Holland.

Exhibiting: "Air-Van" roof ventilators, both direct drive and belt drive.

GANNON CO., INC., THE RUSSELL R., 5535 Vine St., Cincinnati 16, Ohio—Booths 1162, 1164

GAS HEAT, 2 W. 45th St., New York 36, N. Y.—Booth 948

Exhibiting: Publication:

GENERAL AIR CONDITIONING CORP., 4542 E. Dunham St., Los Angeles 23, Calif.—Booth 324

In attendance: J. E. Kercheval, J. L. Paulus, Warren Speyer.

Exhibiting: Residential and commercial air conditioners for heating and cooling; 2, 3 and 5 ton heat pumps.

GENERAL BLOWER CO., 8618 Ferris Ave., Morton Grove, Ill.—Booth 632

In attendance: R. P. Scott, Wm. W. Meyer, C. Obie, John Kassel, H. R. Johnston, C. N. Shaw, C. L. Kush.

Exhibiting: Centrifugal fans, industrial fans (material handling), and turbo pressure fans. New "Perfect Circle" turbo design, and newly designed line of industrial fans with three different types of wheels, will be featured.

GENERAL CHEMICAL DIV., ALLIED CHEMICAL & DYE CORP., 40 Rector St., New York 6, N. Y.—Booth 147

In attendance: H. L. Robbins, J. J. Tomlinson, H. C. Burki, J. C. Woyahn, C. B. Price, R. A. Witzig, W. G. Webster.

Exhibiting: "Genetron Super Dry" refrigerants.

GENERAL CONTROLS CO., 801 Allen Ave., Glendale 1, Calif.—Booth 714

In attendance: J. F. Ray, F. E. Weldon, J. A. Wolff, S. B. Ladd, B. L. Lerch.

Exhibiting: Automatic controls for heating, cooling, and air conditioning equipment, and combustion controls and industrial instruments for commercial heating equipment, including room thermostats, solenoid valves, motor operated valves, oil burner controls, and combustion safety devices. New room thermostat "in modern styling, with slim silhouette and horizontal look," for heating, cooling and combination (air conditioning) application will be featured.

GENERAL DYNAMICS CORP. — see ELECTRO-DYNAMIC DIV. and ELECTRIC BOAT DIV.

GENERAL ELECTRIC CO., APPARATUS SALES DEPT., 1 River Rd., Schenectady 5, N. Y.—Booth 39

In attendance: C. J. Ossenfort.

Exhibiting: General purpose fractional motors, specialty component motors, capacitors, heating controls, general purpose control, leak detection equipment.

GENERAL ELECTRIC COMMERCIAL & INDUSTRIAL AIR CONDITIONING DEPT., 5 Lawrence St., Bloomfield, N. J.—Booth 932

In attendance: C. B. Ramsdell, E. R. Pierce, R. A. Sestero, R. D. Roley, B. Natkin, W. Mulcock, A. F. Salvatoriello, R. E. Bilby, C. J. Rigby, I. Pittleman.

Exhibiting: Packaged air conditioners, including vertical, water-cooled units available from 3 through 15 tons, and featuring new packaged horizontal units for ceiling or shelf mounting, offered in 3, 5 and 7½ ton water cooled and 3 and 5 ton air cooled models. Sharing the exhibit will be line of water coolers. Applications for enrollment in the G-E packaged air conditioning retail sales training course will be taken at the booth.

GENERAL FILTERS, INC., 43800 Grand River Ave., Novi, Mich.—Booth 916

In attendance: Robert G. Gregory, Roland A. Redner, Robert P. Redner, Mrs. Grace Redner, W. A. Proctor.

Exhibiting: Fuel oil filters for both light and heavy fuel oils; warm air humidifiers; soot remover; water traps, etc.

GENERAL MOTORS CORP.—see DELCO PRODUCTS DIV. and FRIGIDAIRE DIV.

GENERAL PLATE DIV. — see METALS & CONTROLS CORP.

GENERAL PRODUCTS CO., INC., Fredericksburg, Va.—Booth N-544

In attendance: H. S. McKann, R. C. Brillhart, J. E. Rowell, F. C. McGready, Vic Vogel.

Exhibiting: "Air-Jet" all fuel packaged chimney.

GENERAL REGISTER CORP., 14 Factory St., Cedar Grove, N. J.—Booth 1269

Exhibiting: Registers, grilles, convector grilles.

GERWIN INDUSTRIES, INC., 214 Spring St., Michigan City, Ind.—Booth 611

In attendance: L. C. Cotts, Dan A. Lynch, Richard Cullom, Russell Luchtman.

Exhibiting: Extended baseboard air distributors.

GIBSON REFRIGERATOR CO., DIV. OF HUPP CORP., Greenville, Mich. —Booths 210, 212, 214

GOODFELLOW CO., INC., E. D., 496 E. Bodley Ave., Memphis 6, Tenn.—Booth 833

In attendance: E. D. Goodfellow, C. E. Goodfellow, D. Ballon, W. T. Dawkins, C. R. Crain, C. L. Goodfellow.

Exhibiting: Newly designed induced draft cooling towers of propeller and centrifugal types, centrifugal pumps in sizes from ¼ through 30 hp.

GOODYEAR TIRE & RUBBER CO., INC., 1144 E. Market St., Akron 16, Ohio—Booth 444

In attendance: J. L. Krouse, C. E. Davis, A. R. Clark, G. G. Cartwright, C. R. Graham.

Exhibiting: "Pliotron" electrostatic selfcharging washable air filter for home, office and factory.

GORDON & PIATT, INC., Bldg. 3110 Strother Field, P. O. Box 914, Winfield, Kans.—Booth 54

In attendance: M. K. Gordon, W. R. Piatt, W. E. Robb.

Exhibiting: Domestic gas burners, commercial and industrial gas burners. Combination "Duo-Flame" gas-oil burner, with fuel transfer possible at any time during or between operating cycles, three sizes with maximum capacities of 10, 20 and 30 gph, and equipped with electronic combustion safeguard with programmed blower operation for purging the firebox before and after each operating cycle, will be featured.

GOULDS PUMPS, INC., Seneca Falls, N. Y. —Booth 728

GOVERNAIR CORP., 4840 N. Sewell, Oklahoma City, Okla.—Booths N-306, N-405

GREEN FUEL ECONOMIZER CO., INC., 700 Main St., Beacon, N. Y.—Booths 1243, 1245

In attendance: B. deTurenne, G. V. Eiserman, G. S. Johnson, C. H. Nelson, J. Lynch, J. J. Adams, J. J. Johnson, W. F. Byrnes, V. U. Mammano, O. A. Petti, W. Cawthon, W. L. Gabbert, J. B. Hewett.

Exhibiting: Automatic air filter.

GRINNELL CO., INC., 260 W. Exchange St., Providence 1, R. I.—Booth 732

Exhibiting: Pipe fittings, P.V.C. fittings, welding fittings, fabricated piping, diaphragm valves, pipe unions, "Thermolier" unit heaters, pipe hangers, engineered hangers, constant support hanger, sway braces.

GUSTIN-BACON MFG. CO., 210 W. 10th St., Kansas City 5, Mo.—Booths 729, 731

In attendance: M. F. Hauserman, Jr., G. P. Oldham, F. W. Muller, H. M. Grant, H. O. Sheidley, Wm. Smurdon, Jim McAdams, Joe Fairfield.

Exhibiting: Thermal acoustical glass fiber insulation, "Snap-On" pipe insulation, "Ultralite" and "Ultrafine" duct insulation and liner. A new molded glass fiber duct in round form will be introduced.

HALL-NEAL FURNACE CO., 1324 N. Capitol, Indianapolis, Ind.—Booth 1049

In attendance: Tom Williams, Tom Smith, Wendell Fleener, Cliff Harris, Joe Wellmuth, Arnold Masengale, Bill Stiller.

Exhibiting: Full lines of "Victor" heating and "Victoraire" cooling equipment. New 1957 heating equipment will be featured.

HALSTEAD & MITCHELL, 705 Bessemer Bldg., Pittsburgh 9, Pa.—Booth 1002

In attendance: Byron Halstead, Wm. Rapp, H. I. Schmidt, Robert Nelson, Wm. Moffitt, Harry Smith.

Exhibiting: Cooling towers, air cooled condensers, water cooled condensers, and blast cooling and heating coils.

HAMLIN CO., INC., J. F., 746 Ellis St., San Francisco 9, Calif.—Booth N-217

In attendance: Theodore Wysocki, Jean Blinn, Norris Ward, Paul Lamber, Ed Johnson, Joe Alaimo, George Wolf, Ralph Zentara, Edmund Beaubien.

Exhibiting: "Kor-it" concrete hole saw, junior concrete hand drill, and concrete saw. The large concrete hole saw weighs only 160 lb and may be carried in an automobile luggage compartment. It feeds automatically.

HARRIS & CO., ARTHUR, 212 N. Aberdeen St., Chicago 7, Ill.—Booth 1062

In attendance: George C. Harris, Arthur H. Elliott, Norman H. McClevey.

Exhibiting: Copper, stainless steel, monel, nickel, and steel floats.

HART & COOLEY MFG. CO., 500 E. 8th St., Holland, Mich.—Booth 1132

In attendance: G. D. Heeringa, E. J. Rowder, J. H. Van Dyke, G. J. Braun, R. W. Gordon, R. J. Kubat, W. K. O'Brien, R. Smeenge.

Exhibiting: Registers, grilles and diffusers for residential and commercial heating and air conditioning. New baseboard "Diffusaire" with "Air-foil" valve and "Flexo-flange" will be featured.

HART HEAT DIV., AVERY FARM MACHINERY CO., Foot of Leland St., Peoria, Ill.—Booth N-401

In attendance: Earl K. Smith, Lloyd F. Smith.

Exhibiting: "Supra Flame" oil burners, oil fired furnace-burner units and boiler-burner units, gas fired furnace-burner units and boiler-burner units. Live operating demonstration of "Supra-Flame" oil burner with integral burner mounted primary safety control and new patent pending air diffusion controller will be featured.

HASTINGS AIR CONTROL, INC., 3215 Leavenworth St., Omaha 5, Nebr.—Booth 507

In attendance: M. S. Frankle, Felix Roth, L. Wintroub, P. Wintroub, R. L. Wintroub, T. M. Evans, Bennett Cohn, Lou Genung.

Exhibiting: Chilled water air conditioning equipment (floor models, suspended units and package coils); combination water and "Freon" coil conditioners (self-contained package units for business and home use); heating equipment (suspended unit heaters of fan, "Inshot" and duct type); forced combustion burners ("Inshot" and adjustable "V" type units); "Hoist-It," an adjustable, portable hoist designed to lift air conditioning equipment a maximum of 18 ft, 4000 lb capacity, two-man operation. "Clean-It" portable cleaning and washing equipment for condensers, air conditioning coils, blower wheels, housings, etc., will be featured.

HEATING & AIR CONDITIONING CONTRACTOR, 92 Martling Ave., Tarrytown, N. Y.—Booths 1239, 1241

Exhibiting: Publication.

HEATING, PIPING & AIR CONDITIONING, 6 N. Michigan Ave., Chicago 2, Ill. — Booth 924

In attendance: Charles E. Price, Wallace J. Osborn, Robert A. Jack, C. M. Burnam, Jr., Robert W. Roose, John H. Reock, George C. Cutler, Thomas V. Johnson, David V. Mahan, Robert J. Osborn.

Exhibiting: Heating, Piping & Air Conditioning magazine; technical books; market information.

HEAT-TIMER CORP., 657 Broadway, New York 12, N. Y.—Booths 336, 338

In attendance: Edward J. Zeitlin, Albert Fowler, Richard Lassar.

Exhibiting: Weather actuated heating controls, "Varivalves," "Thermovalves," main line quick vent valves, heat recorder-totalizer, smoke indicating alarms, smoke alarms, "Robot-Eye" combustion controls.

HEIL CO., THE, 3000 W. Montana Ave., Milwaukee 1, Wisc. — Booths 1117, 1121, 1125

In attendance: G. E. Hochstein, J. S. Huber, R. L. King, F. Zwanzig, W. Edwards, K Mould, A. Eunson, L. Danielson.

Exhibiting: Oil and gas furnaces, oil and gas boilers, air conditioners.

HENRY FURNACE CO., THE, Medina, Ohio — Booths 832, 933

HENRY VALVE CO., 3215 North Ave., Melrose Park, Ill.—Booth N-440

In attendance: R. S. Dickert, C. V. Gary, Evan Jones, P. G. Kollberg, J. R. McCahill.

Exhibiting: Valves, driers, strainers and accessories for refrigeration, air conditioning and industrial applications, including: bronze alloy check valves (piston type); new types "515" and "516" diaphragm packless valves of forged brass; brass, flanged, angle refill cartridge type driers; non-refillable type driers; forged steel packed liquid level gage set; brass, single and double port liquid indicators; forged brass angle relief valve; brass "straight-through" type relief valves; flanged, angle and "Y" type strainers; bronze alloy wing cap packed valves; semi-steel wing cap packed valves; semi-steel wing cap flanged valves with various type end connections. Types "515" and "516" diaphragm packless valves, and semi-steel wing cap flanged valves with various type end connections, including OD solder brass adapter and steel flange, steel butt weld adapter and steel flange, one piece F.P.T. flange, and one piece slip-on weld flange, will be featured.

HIDDEN HEAT, INC.—see HI-FLOW PRODUCTS, INC.

HI-FLOW PRODUCTS, INC., and HIDDEN HEAT, INC., 1395 Marconi Blvd., Copiague, L. I., N. Y. — Booth 719

In attendance: Philip Seligson, Peter Garcia.

Exhibiting: Oil burner, gas burner, hot water heating boiler, radiant panels and accessories, manifolds. Prefabricated complete slab assembly of radiant panels requiring no field welds or threading, representative radiant installations being illustrated, will be featured.

HILTI RAPID FASTENING SYSTEMS INC., 55 Vandam St., New York 13, N. Y. — Booth N-402

In attendance: H. P. Rossiger, Wm. Roller, H. J. Shillings, W. E. Pestalozzi, F. Durant.

Exhibiting: Hammer actuated drive tools, "Conic" studs and pins. A series of new drive tools designed for special applications will be demonstrated.

HUPP CORP., GIBSON REFRIGERATOR CO. DIV., Greenville, Mich. — Booths 210, 212, 214

HUPP CORP. — See PERFECTION INDUSTRIES DIV. and TYPHOON AIR CONDITIONING CO.

HYDROTHERM, INC., Northvale, N. J. — Booth 772

In attendance: J. F. Baier, W. F. Hosmer, E. C. Jackson, H. D. Staman, F. W. Helikson.

Exhibiting: Gas fired hot water heating equipment.

ILG ELECTRIC VENTILATING CO., 2850 N. Pulaski Rd., Chicago 41, Ill. — Booths 1037, 1041

In attendance: J. M. Frank, W. H. Rietz, J. J. Friedler, Jr., C. W. Dexter, R. Rucker, B. L. Casey, A. C. DeSmet, W. H. Hallsteen, M. J. Joyce, C. F. Rietz, S. Heyerick, W. G. Sterba.

Exhibiting: Airfoil centifugal fans, volume and pressure centrifugal fans, propeller and centrifugal power roof ventilators, high and low speed propeller fans, explosionproof and tubeaxial propeller fans, horizontal and vertical unit heaters, all-electric unit heaters, home cooling fans, kitchen ventilators.

ILLINOIS ENGINEERING CO., 2035 S. Racine Ave., Chicago 8, Ill.—Booths 38, 40

In attendance: C. A. Pickett, J. J. Willis, P. B. Hultgren, J. L. Ehretsman, R. W. Leutwiler, G. W. Snagel, G. N. Baustian.

Exhibiting: Heating specialties, control systems, condensate pumps, heat exchangers, convectors.

ILLINOIS IRON & BOLT CO., W. Main St., Carpentersville, Ill. — Booth 207

In attendance: J. M. McClintock, J. M. Mullaney, F. W. Cochrane, P. MacDuffy.

Exhibiting: "Combustioneer" stoker, "Freeman" stoker, "Freeman" furnaces "Freeman" incinerators, "Burdett" conversion burner.

ILLINOIS TESTING LABORATORIES, INC., 420 N. La Salle St., Chicago 10, Ill. — Booths 974, 1073

In attendance: J. A. Obermaier, M. J. Rauscher, W. J. Bailey, J. J. Kuska, M. D. Carlson, C. O. Wilson, R. E. Fleming.

Exhibiting: Pyrometers, velometers, dew point indicators.

IMPERIAL BRASS MFG. CO., THE, 1200 W. Harrison St., Chicago 7, Ill. — Booth 1272

In attendance: T. A. Fuite, C. O. Engels, J. Maloney, J. Galloway, A. Hallstrom, G. Williams, J. Gillespie, E. F. Todd, M. L. Warder, C. H. Benson, H. T. McNellis, F. J. McNellis, G. E. Franck.

Exhibiting: Tube fittings in brass, steel, aluminum, stainless steel and nylon, including "Hi-Seal," "Hi-Duty," "Ermeto," 45 deg and 37 deg flared, compression, "Poly-Flo," "Nylo-Seal," "Flex;" refrigeration valves, fluid control valves; tube cutters, flaring tools, tube benders, test plugs, reamers, pinch-off tools, swaging tools, refacing tools; pressure hose and couplings for low, medium and high pressure applications; refrigerant charging and testing units and other service tools. New "Diamond" valves for refrigeration applications, new "Golden Torpedo" refrigerant driers, new "Magic-Eye" liquid indicators with solder connections, new "Micro-Strictor" for constricting capillary tubing, combination tube cutter and tube constrictor, new 9-in-1 flaring tool, and new improved "Blue Dot" lever-type tube benders will be featured.

INDEPENDENT BLADE CO., 587 Thompson Ave., East Haven 12, Conn. — Booth N-420

In attendance: Ray Westlund, Jr., T. S. House, Victor D. Vogel, Joe Vogel, Earl Newville, Earl T. Peck, Edward Lepowsky.

Exhibiting: Complete line of over 30 types and sizes of saw blades incorporating new "Fit-Al" tang designed to fit chuck of all types of reciprocating saws. Types to be shown include "Wood-Master" for cutting wood, lumber with nails, roughing-in, heating, electrical, insulating, plumbing, and maintenance work; "Metal-Master," of flexible high speed steel, for cutting sheet metal, angles, bar stock, "Transite," hard rubber, fiber, etc.; and introducing new "Plaster-Master" blade, of flexible stock and specially hardened, for longer cutting life in plaster and similar abrasive materials.

INDEPENDENT REGISTER CO., THE, 3747 E. 93rd St., Cleveland 5, Ohio — Booth 437

In attendance: K. B. Solberg, B. N. Richardson, A. H. Ullman.

Exhibiting: Registers and grilles for heating, ventilating, and air conditioning. "Fabrikated" wall grilles, special large sizes made to order, will be featured.

INDUSTRIAL ACOUSTICS CO., INC., 341 Jackson Ave., New York 54, N. Y. — Booth N-411

In attendance: Martin Hirschorn, Stannard M. Potter, A. C. Hawthorne, Alfred H. Siebel, Walter F. Ring, Charles Rink.

Exhibiting: "I.A.C. Q-Duct" packaged, standardized silencer showing the acoustical performance in comparison to other types of ducts.

INGERSOLL CONDITIONED AIR DIV., BORG-WARNER CORP., 760 E. Vine St., Kalamazoo, Mich. — Booths 658, 662, 666

In attendance: R. C. Hauck, W. T. Goldsmith, G. Bosch, H. Swan, Gray Huston, Allan B. McLellan, Owen Marquette, George Brown, Ed Doutlick, Phil Donnelly, Carroll Crowe, Ken Junker, Ed Effinger, Al Frederick, Jim McNamara.

Exhibiting: New attic stowaway model air conditioner, 105,000 Btu input natural gas counterflow belt drive, new oil furnace (deluxe model), new oil furnace (builder model), remote high-sides with A-type evaporator coils, "Airline" diffuser and boot, electronic filter, square cased coal fired furnace, vertical air-cooled companion unit, remote condenser, remote high-side compressor unit, downflow evaporator coil, gas lo-boy furnace, oil suspended furnace, oil hi-boy furnace. New oil furnaces, remote high-sides with A-type evaporator coils, diffuser and boot, electronic filter, and new attic stowaway model air conditioner will be featured.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y. — Booths 1255, 1257

In attendance: W. J. Kearns, T. Bosshard, Jr., S. B. Wolfe, Jr., S. S. Orben, R. J. O'Donnell, R. F. Totman, H. W. Newsome, H. L. Clarke, R. Watkins, W. W. Cramer, W. Acosta, R. Whelan, A. J. Tyler, E. L. Raining, E. L. Hawes.

Exhibiting: Centrifugal pumps. Results of friction loss on piping and fittings will be demonstrated visually.

INSTO-GAS CORP., 998 E. Woodbridge Ave., Detroit 7, Mich. — Booth N-412

In attendance: William W. Steinert, James Hirshfeld.

Exhibiting: Torches and furnaces, soldering iron heaters, salamanders, infra-red heaters.

INSUL-LYTE CORP., DIV. OF PLIBRICO CO., 130 W. Pleasant St., River Rouge 18, Mich.—Booth N-406

In attendance: James R. Crosby, Lester E. Hyde, Victor Vogel, Joseph Vogel, H. L. McNally, J. D. McNally.

Exhibiting: Combustion chambers, baffles, domestic and commercial refractories. Adjustable leg baffle will be featured.

INTERNATIONAL BASIC ECONOMY CORP. —see ANDERSON CO., V.D.

INTERNATIONAL BUSINESS MACHINES CORP., 590 Madison Ave., New York 22, N. Y. — Booth N-201

Exhibiting: Electronic central control systems for automatic or manual control of air conditioning, heating and similar utility functions will be demonstrated.

INTERNATIONAL HEATER CO., 101 Park Ave., Utica 2, N. Y. — Booth 28

In attendance: Robert Adloff, Dan Banner, Irving Barber, Charles Bremer, Cal. Calhoon, Elwood Hesch, Jack Hildebidle, George Johnson, Dan McCarthy, Jay Rhodemyre, Allen Trask, Cloyd Weaver, Millar Wheeler, Leonard White.

Exhibiting: Gas and oil lowboys, highboys, counterflows, suspended units; complete line of cooling equipment, including air cooled remote, compressors up to 6½ hp, cooling coils and plenums for all types of systems, horizontal unit coolers, horizontal self-contained units, commercial units. Unit coolers, 6½ hp air cooled remote compressor and commercial units; and two gas conversion burners, up to 310,000 Btu input, 250,000 Btu gas lowboy, will be featured.

INTERNATIONAL MFG. CO., AIR CONDITIONING DIV., 600 E. Grand Ave., Oklahoma City, Okla. — Booths 1054, 1056

In attendance: James D. Harden, Glenn Tharp, Kenneth Lumery, Ion Caloger.

Exhibiting: Remote type, chilled and hot water units in capacities of ½, ¾, 1, 1½, 2, 2½, and 3 tons for concealed or exposed installations in hotels, office buildings, motels, etc. Twelve new units in 2, 2½, and 3 ton sizes and four models (ceiling hideway, ceiling enclosed, console hideway, console enclosed) will be featured.

IRON FIREMAN MFG. CO., 3170 W. 106th St., Cleveland 11, Ohio — Booth 224

In attendance: D. P. Bailey, L. J. Cox, H. M. Cutshaw, G. T. Kaufman, R. F. Lunt, W. F. Strong, R. C. Wright, Dale Wylie.

Exhibiting: Several different models of commercial and industrial oil, gas, and combination gas-oil burners. "MicroMist" oil atomizing burner for heavy oils, including No. 5, with range of 3 to 25 gph; and commercial forced draft burner, will be featured.

IRON FIREMAN MFG. CO. — also see PETRO DIV.

JACKES-EVANS MFG. CO., 4427 Geraldine Ave., St. Louis 15, Mo. — Booth 235

In attendance: Stanley F. Jackes, A. M. Cornwell, Jr., John H. Marling, Joe Boing, Frank Vargo.

Exhibiting: Solenoid valves (7/64 in. to 1-½ in. port sizes, 1 to 250 psi, 0 to 225 F). Exhibit includes first showing of new multivoltage coil, now available for all "J-E" solenoid valves, for flow control of water, "Freon" 12 and 22, industrial coolants, brines, etc., through 42 different valve styles and capacities, and with any one of seven electrical circuits (115/25, 115/50 and 60, 208/50 and 60, 230/50 and 60), data plate showing correct hook-up being supplied with each valve.

JACKSON & CHURCH FURNACE DIV., 321 N. Hamilton St., Saginaw, Mich. — Booths 846, 850

In attendance: D. L. Perrot, L. S. Redford, H. K. Beck, F. C. Adams, F. E. Young, P. W. Adams, Ray Boland, R. V. Chisolm, T. L. Conlon, A. E. Duwe, E. M. Fondersmith, C. C. Kerndt, Harry Linch, A. G. Nye, B. H. Pettit, A. W. Pracker, L. J. Prues, S. M. Stroh, H. A. Weller.

Exhibiting: Oil and gas and dual fuel direct-fired unit heaters; oil and gas suspension units; oil, gas and dual fuel industrial and institutional units. New direct-fired "Power Saver" unit heaters for gas, oil and dual fuel will be featured.

JANITROL HEATING & AIR CONDITIONING DIV., SURFACE COMBUSTION CORP., 400 Dublin Ave., Columbus 16, Ohio — Booth 2

In attendance: R. E. Ireland, Paul A. Ryan, Ray Reed, Fred S. Hamer, C. H. Langendorf, W. R. Egan, R. R. Sandusky, Les Shaefer, Don H. Clague, Abner Baker, R. R. Ramsey, R. H. Balk, R. B. Thornburgh, R. L. Deeley, C. C. Owen, L. J. Monahan, H. C. Gurney, E. H. Lloyd, J. I. Trimble, Wm. M. Myler, M. L. Lavorgna, Arno Gerdsen, N. B. Buehrer, F. J. Evans, H. A. Macfarline, L. S. Reagan, G. Bergholdt, W. Charles, H. W. Blauthe, F. Johnson, G. Kelley, J. O'Brien, R. A. Bell, R. W. Glenn.

Exhibiting: Gas winter air conditioners, year 'round conditioners, unit heaters, conversion burners, oil winter air conditioners, summer air conditioners.

JEFFERSON ELECTRIC CO., Bellwood, Ill. — Booth 749

JENKINS BROS., 100 Park Ave., New York 17, N. Y. — Booth 1230

JENN AIR PRODUCTS CO. INC., 1102 Stadium Dr., Indianapolis 7, Ind — Booth 928

In attendance: L. J. Jenn, G. V. Patterson, H. J. Kennedy, Rex Welch, W. E. Morrison.

Exhibiting: Power roof and wall exhaust fans (both direct drive and belt drive); relief vents. U-spring "Quiet Tested" units which use stainless steel springs as a method of suspension will be displayed.

JOHNS-MANVILLE SALES CORP., 22 E. 40th St., New York 16, N. Y. —Booth 533

In attendance: H. Thomas, J. G. Williams, A. W. Bergman.

Exhibiting: "Transite" air duct, "Fibrocel" pipe insulation, "Spintex" home insulation.

JOHNSON CO., S. T., Oakland, Calif., and Bridgeport, Pa. — Booths 643, 645, 647

In attendance: D. E. Johnson, Al Dimick, W. J. Trombly, Robert P. Johnston, W. S. Harlacher, W. E. Lees, R. Knapp.

Exhibiting: Commercial, industrial and residential oil and combination oil or gas burning equipment; forced draft units; gas boilers. The forced draft units will be featured.

JOHNSON SERVICE CO., 507 E. Michigan St., Milwaukee, Wisc. — Booths 616, 620, 624

JOURNAL OF PLUMBING, HEATING & AIR CONDITIONING, 92 Martling Ave., Tarrytown, N. Y. — Booths 1239, 1241

Exhibiting: Publication.

JOY MFG. CO., 333 Oliver Bldg., Pittsburgh 22, Pa — Booths 510, 514

In attendance: Raymond Maneha, J. P. Cartwright, Richard Heindel, William Hay, H. R. Carlson.

Exhibiting: "Series 1000 Axivane" standard fans (complete line), "Microdyne" dust collector (miniaturized wet-inertial type) will be featured.

KAISER ALUMINUM & CHEMICAL CORP., Kaiser Bldg., 1924 Broadway, Oakland 12, Calif. — Booth 1067

KAISER CO., E. B., 2114 W. Lake Ave., Glenview, Ill. — Booths 546, 548

In attendance: Edw. B. Kaiser, Jr., W. F. Kellogg, C. W. Kimbrough, F. J. Ross.

Exhibiting: "Ebko" prefabricated, insulated underground and overhead piping systems; viscous liquid handling systems; heat exchangers and tank suction heaters.

KAUSTINE FURNACE & TANK CORP., Perry, N. Y. — Booth 606

In attendance: J. B. Mollnow, Sr., J. B. Mollnow, Jr., R. E. Preine, W. F. Stahl, Harry Oxenreider.

Exhibiting: Gas and oil fired residential heating units.

KEENEY PUBLISHING CO. — see AMERICAN ARTISAN and HEATING, PIPING & AIR CONDITIONING

KENNARD CORP., 1819 S. Hanley Rd., St. Louis 17, Mo. — Booths 716, 720

In attendance: Sam M. Kennard, III, W. Boardman Jones, Jr., Fred G. Bietsch, Ben M. McDougall, Fred W. McKenna, Robert C. Sweiger, Lewis Davidson.

Exhibiting: Air conditioning blower units, liquid chiller, cooling towers, coils.

KEWANEE BOILER DIV. — see AMERICAN-STANDARD, KEWANEE BOILER DIV.

KINNEY MFG. DIV., THE NEW YORK AIR BRAKE CO., 3529 Washington St., Boston 30, Mass. — Booths 1155, 1159

KOCH ENGINEERING CO., INC., 321 W. Douglas Ave., Wichita 2, Kans. — Booth 1122

In attendance: Ranie Love, Fred Blackshere, Jack Kice.

Exhibiting: Jet forced draft cooling towers, 5 to 25 tons. Forced draft cooling towers "moving air by jet action without fans, motor, belts, etc.," will be featured.

KODY BLOWER CO., P. O. Box 765, Trenton 5, N. J. — Booths 640, 644

KOPPERS CO., INC., METAL PRODUCTS DIV., 200 Scott St., Baltimore 3, Md. — Booth 246

In attendance: Sid Fedan, George Thomas, R. D. Lemmerman, J. L. Phillips, T. F. Naylor, J. E. Onnen.

Exhibiting: "Aircoustat" sound attenuators, "Hi-Valve Aircoustat" sound attenuators, "Soundmetal" panels for cooling tower applications, "Aeromaster" fans for industrial cooling.

KORFUND CO., INC., THE, 48-15 32nd Pl., Long Island City 1, N. Y. — Booth 42

In attendance: J. I. Hammond, Jr., N. Creash, S. L. Perlow, Donald H. Vance.

Exhibiting: Steel spring machinery mounts for vibration isolation ("Vibro-Isolators"), pad type mountings ("Elasto-Rib" pads and dampers), fan motor bases, slide rail motor bases, pipe and equipment hangers ("Vibro-Hangers"). New universal "Elasto" damper will be featured.

KRITZER RADIANT COILS, INC., 2901 Lawrence Ave., Chicago 25, Ill.—Booths 107, 109

In attendance: Henry E. Kritzer, Henry I. Kritzer, Jr., C. G. Newton, L. D. Mandell, W. K. Smith, E. J. Hoppe, C. C. Schedler, R. F. Beattie, W. S. Berresheim, L. J. Potvin, E. A. Sidney, E. Roebuck, W. J. Potvin, E. J. Kwasinski, W. Esterdahl, J. L. Shank, Pat Savage, D. M. Archer, F. E. Baird, W. H. Baker, J. A. Berger, M. M. Berger, C. H. Buck, H. V. Caton, J. W. Cherry, R. L. Craig, E. H. Crozier, J. N. Doyle, J. H. Fogg, T. C. Gianos, L. N. Green, J. L. Harvey, E. L. Herbert, Ralph Hyer, H. P. Jensen, E. L. Kuderling, W. A. Teffer, Louis Loeffler, Jr., Walter Loeffler, C. G. Lorion, R. H. McGeorge, Sr., H. L. McMurry, J. D. MacLean, J. K. MacLean, W. F. MacLindon, H. A. MacVicar, G. I. Mellerup, R. A. Provine, L. E. Ralston, H. G. Richardson, R. L. Rothrock, R. A. Sansing, Jr., R. A. Seepe, M. E. Siegfried, R. E. Sears, J. Bert Slater, J. W. Stevens, W. T. Wheeler, W. C. Woods, W. R. Johnson, H. J. Lippke, C. W. Morrill, J. L. Myers, F. L. Nelson, A. C. Patterson, B. R. Peterson, D. O. Peterson, Seth P. Wood, Bernard Zaritzky.

Exhibiting: Hot water baseboard, convectors, commercial and industrial fin tube, unit heaters, heating/cooling units, water chillers, warm air baseboard.

KRUEGER AIR CONDITIONING CO., 19 E. Rillito St., Tucson, Ariz.—Booth 308

In attendance: Leo Krueger, J. B. Smith, T. B. Kleckner, Jules Schor.

Exhibiting: Registers and grilles.

L.O.F. GLASS FIBERS CO., 1810 Madison Ave., Toledo 1, Ohio—Booth 1120

LAKE CHEMICAL CO., 3052 W. Carroll Ave., Chicago 12, Ill.—Booths N-216, N-220

Exhibiting: "Pipetite-Stik" pipe joint compound in stick form; "Olytite-Stik" sealing cement for oil leaks; "Krak-Stik" sealing cement for cracks, splits and gaskets; non-acid, self-cleaning, paste, stick and liquid form fluxes - "La-Co" regular flux, electro flux, silver solder flux, stainless steel and chrome flux, aluminum flux. There will be an actual demonstration of sealing spurting oil leaks while oil is running through cracks, and actual soldering operations of copper, aluminum, stainless steel and other metals will be shown.

LAU BLOWER CO., 2001 Home Ave., Dayton 7, Ohio—Booth 836

In attendance: C. Miley, E. Humphrey, W. Morrisey, D. Jensen, W. Lohrey, G. Mergenthaler, H. Seebach, C. Sigman.

Exhibiting: Heating and air conditioning blowers, wheels, belts, bearings, pulleys.

LAWLER AUTOMATIC CONTROLS, INC., 453 N. Mac Questen Pkwy., Mt. Vernon, N. Y.—Booth 110

In attendance: R. C. Smith, Jr., J. R. Lawler, Jr., Parker Tyler, Phillip Barret, Andrew Wehrli, Robert Brumitt.

Exhibiting: Thermostatic control valve. New model temperature regulators will be featured.

LENNOX INDUSTRIES INC., 1701 E. Euclid Ave., Des Moines 5, Iowa—Booths N-334, N-336

In attendance: Martin G. Beline, Norman L. Rutgers, Robert Sparks, Ed C. Riggs.

Exhibiting: Roof ventilators, man coolers, and vent sets, and featuring "Comfort Curtain" heating and ventilating system for school classrooms, and industrial heating and ventilating.

LESLIE CO., Lyndhurst, N. J.—Booth 225

LEWIN-MATHES CO., 1111 Chouteau Ave., St. Louis 2, Mo.—Booth 106

In attendance: Allan B. Lewin, Roy Klostermeyer, Pat Leonard, Robert Cook, Robert Leonard, James Lewin.

Exhibiting: Copper and brass tube and rod, miniature draw bench drawing copper tubing.

LIBBEY-OWENS-FORD GLASS CO., 608 Madison Ave., Toledo 3, Ohio—Booth 633

LIMA REGISTER CO., 1790 N. Cable Rd., Lima, Ohio—Booth 316

In attendance: Henry R. Pataky, Norman F. Jones, Lee Beckman, Joe Irvin, C. B. Armour, C. J. LeMaster, R. B. Morey, H. F. Robinson, J. G. Thomas.

Exhibiting: Registers, diffusers and grilles for heating and air conditioning. New series 72 diffusers will be featured.

LITTLE GIANT PUMP CO., Box 9545, Oklahoma City, Okla.—Booth 564

LOCKFORMER CO., THE, 4615 W. Roosevelt Rd., Chicago 50, Ill.—Booth 1233

In attendance: George W. Lamberson, Ed C. Bill, John L. Davis, Leo R. Gale, I. Thompson.

Exhibiting: "Lockformers" Nos. 24, 20 and 16, snap lock machine, "Cleatformer," standing S-cleat machine, complete power slitter. "Super Speed No. 20 Lockformer" and self guiding flanging attachment will be featured.

LONERGAN MFG. DIV. OF McGRAW ELECTRIC CO., 704 N. Clark St., Albion, Mich. —Booth N-317

In attendance: Philip J. White, Rowe Greenway, Robert J. Wellman, John R. Lonergan.

Exhibiting: Remote central air conditioning and self-contained central air conditioning.

LYCOMING DIV., SPENCER HEATER, AVCO—see SPENCER HEATER

MAGIC AIRE DIV., UNITED ELECTRIC CO., 501 Galveston St., Wichita Falls, Texas —Booth N-504

In attendance: Maurice W. McCall, Craig T. Gaines, Riley Cook.

Exhibiting: Evaporator coils, condenser coils, air cooled condensers, evaporative coolers. V coil evaporators for use in converting forced air heating systems to air conditioning will be featured.

MAGNETROL, INC., 2110 S. Marshall Blvd., Chicago 23, Ill.—Booth 1154

MAID-O'-MIST, INC., 3217 N. Pulaski Rd., Chicago 41, Ill.—Booth 216

In attendance: O. V. Woolley, H. J. Carr, J. A. Madden, R. Schneider, Wm. G. Mussun, Joseph O'Connor, R. W. Hall, H. T. Waterstraat, Bernard Munding, R. Fitzgerald, E. E. Berthet, L. E. Pelletier, M. G. Hanson, C. L. Boyer, L. Schneider, Rich Lloyd, H. E. Culley, M. D. Puckett, J. L. Edgar, E. H. Price, Fred French, J. Wm. Walter, John F. Templeton, James McEntee, George Miller.

Exhibiting: Warm air, hot water, steam and atomizing spray automatic humidifiers and related items; complete line of float operated air valves for hot water heating, and chilled water cooling systems; balancing valve adapter units for hot water heating systems; water line float control valves; humidifier valves; water feeders and cut-offs. Automatic humidifier made especially for modern convector radiators, designed to supply ample humidification for either cast iron or copper convector radiators, and made in 10 sizes with evaporating capacities ranging from 1 to 5 gal of water per day, will be featured. Also featured will be convector humidifier to fit counterflow, conventional and year 'round air conditioners which because of narrow troughs, can be installed on either side of a counterflow furnace having a minimum air passage of 3 in.

MAJOR CONTROLS CO., Hwy 71 & Yorba Rd., Corona, Calif.—Booth 326

In attendance: Walter Lee, Richard Bennett.

Exhibiting: Gas appliance pressure regulators and manual shutoff valves. "H-100" pilot regulator will be featured.

MAMMOTH FURNACE CO., THE, 6425 Cambridge St., Minneapolis, Minn.—Booth 911

MANVILLE BOILER CO., INC., 415 Lexington Ave., New York 17, N. Y.—Booth 414

MARATHON ELECTRIC MFG. CORP., Wausau, Wisc.—Booth 762

MARCH MFG. CO., 8015 N. Lawndale Ave., Skokie, Ill.—Booth N-330

In attendance: W. E. Zimmermann, F. N. Zimmermann, R. H. Bennett, W. K. Zimmerann, Bernard E. Konopka.

Exhibiting: Complete line of condensate removal pumps for air conditioning and refrigeration equipment, in both 115 and 230 voltages, designed to mount inside the air conditioning or refrigeration unit. New model "B-F" float controlled pump which mounts inside the air conditioner drip pan under the evaporator coil, is controlled by the water level in the pan and is actuated by a float and mercury switch mechanism will be featured. It handles vertical lifts of over 9 ft and horizontal runs up to 300 ft.

MARCO INDUSTRIES, INC., Womelsdorf, Pa.—Booth 435

MARLEY CO., THE, 222 W. Gregory, Kansas City 14, Mo.—Booth 815

In attendance: L. T. Mart, J. A. Cameron, L. A. Christensen, R. J. Powell, Don Cousins, R. L. McFadin, A. R. Thompson, A. D. Talbot, W. C. Cramer, M. H. McWilliams, C. A. Smith, J. J. Parker.

Exhibiting: Water cooling towers—"Aquatowers" and "Double-Flow Aquatowers."

MARLO COIL CO., 6135 Manchester Ave., St. Louis 10, Mo.—Booth 1207

In attendance: L. C. Pellegrini, F. G. Meyers, W. H. Frenger, Henry Kipp, Victor Porta, J. J. Kramer, W. B. Moses, Jr., K. W. Wicks, J. Vorbeck, H. R. Iverson.

Exhibiting: Air cooled condensers and evaporative coils for heat pump applications, "Seazonaire" remote type units, spray type dehumidifiers, horizontal and vertical air conditioning units, heating and ventilating units. New designs will be featured.

MARSH HEATING EQUIPMENT CO., 3501 W. Howard St., Skokie, Ill.—Booth 525

In attendance: James Emmett, Jr., William M. Ensign, R. E. Barnett, Don L. Warner, Thomas E. Zurick, Harry Kirby, James G. Kelly, Mansur Storrs, S. C. Kauffman, Sr., Chas. Kelly, Fred Hadwin, R. M. Anthony, Jr., Frank J. Whitman, F. E. Keeler, R. G. Dinham, Russell Jacobson, Howard Lavaty.

Exhibiting: Complete line of heating specialties, refrigeration and air conditioning gages, valves, thermometers, solenoid valves, high pressure all-steel needle valves.

MARVAIR DIV., MUNCIE GEAR WORKS, INC., Muncie, Ind.—Booth 1215

MASTER BILT REFRIGERATION MFG. CO., 4209 Folsom Ave., St. Louis, Mo. — Booth 562

MAXITROL CO., 12200 Beech Rd., Detroit 39, Mich.—Booth 321

In attendance: Frank Kern, Jr., Charles Stang, Jr., Robert T. Hlavin, Del V. Krieger, D. L. Zorn.

Exhibiting: Gas pressure regulators in pipe sizes from ⅛ to 3 in.

McDONNELL & MILLER, INC., 3500 N. Spaulding Ave., Chicago 18, Ill.—Booth 1000

In attendance: E. N. McDonnell, John James, James Solon, Nils W. Swanson, George La Roi, Eugene Mitchell, James Platt, James Ramsay, Howard Peary, Dick Berry, John Dobise, Paul B. Holmes, Leo J. Kmiecik, William Gleeson, Russ Evans.

Exhibiting: Safety devices for steam and water heating, and related products. Several new larger capacity Btu rated pressure relief valves will be exhibited for the first time.

McGRAW ELECTRIC CO.—see LONERGAN MFG. DIV.

McINTYRE ENGINEERING CO., INC., 137 S. Linden Ave., South San Francisco, Calif. —Booth N-431

In attendance: Wm. C. McIntyre, Robert A. Clarke, Louis V. Vitali, A. O. Frederick, Wm. G. Craig.

Exhibiting: "M/E" universal hot water heating boiler, "M/E" universal swimming pool boiler, U. S. Navy standard unit cooler. New 250,000 Btu per hr input swimming pool boilers will be featured.

McQUAY, INC., 1600 Broadway N.E., Minneapolis 13, Minn.—Booth 31

In attendance: B. E. James, H. Blake Thomas, W. H. Markson, W. B. Buck, Alvin R. Flynn, Frank F. Altman, Duane R. Wallin, R. E. Sorenson, R. K. Mattson, Norton Korn, H. B. Williams.

Exhibiting: Residential evaporators; ⅜ in., ½ in. and ⅝ in. OD tube evaporators and condensers; jet tube steam coil. Cabinet unit heaters and multizone air conditioners will be featured.

MERCOID CORP., THE, 4201 Belmont Ave., Chicago 41, Ill.—Booth 536

In attendance: Hugh Courteol, J. W. Owens, W. K. Stauffer, W. E. Jones, V. S. Krale, P. J. Provost, J. F. McCauley, W. Ufer, W.

Lischett, W. K. Stein, P. P. Sloss, W. L. Colterjohn.

Exhibiting: Mercury switch equipped controls for pressure, differential pressure, two-stage pressure, temperature, two-stage temperature, liquid level, mechanical movement; transformer-relays; oil burner safety controls; room thermostats; etc.

METALBESTOS DIV., WILLIAM WALLACE CO., Belmont, Calif.—Booth 672

In attendance: Frank Kohles, C. A. Perry, E. F. Fields, R. Frolick, W. Blalock.

Exhibiting: Gas vent pipe and fittings and "Safety Systems" gas vent tables. Gas vent action demonstrator using water in glass pipes to show importance of correct sizing of gas vent piping will be featured.

METALS & CONTROLS CORP., 34 Forest St., Attleboro, Mass —Booth 1104

In attendance: J. Ottmar, W. W. Kuehl, R. M. Glidden, R. W. Peck, E. P. Jastram, A. P. White, B. O. Haun, Jr., F. Stearns, D. K. Wells, J. Cooney, E. Kurtz, J. Woodward.

Exhibiting: *Spencer Thermostat Div.* will show inherent overheat motor protectors, hermetically sealed thermostats, motor starting relays, air conditioning controls, three phase Y-connected motor protectors, appliance thermostats, tube type thermostats, aircraft and automotive circuit breakers, aircraft motor protectors, precision switches. "Klixon" snap-acting disc type thermostats. Fixed temperature control of both domestic hot water and house heating boiler operations will be featured. . . . . *General Plate Div.* will show airfoil shaped strip; "Alcuplate" (copper clad aluminum); thin gage metals; electrical contacts; composite metals (precious and base —wire, sheet, tubing); "Conflex" (hardenable steel clad copper); "Bondwich" (brazing shim); "Nifer" (nickel clad iron); "Truflex" (thermostat metals); "Haynes Stellite" alloys in thin gages; electrical contact tapes; collector or slip rings; silver brazing alloys; stainless steel clad copper; copper clad glass sealing alloys; top-lay contacts and strip; platinum group metals.

MID-CONTINENT METAL PRODUCTS CO., 1960 N. Clybourn Ave., Chicago 14, Ill.—Booth 120

MILLER VALVE CO., INC., 1620 Pennsylvania Ave., Pittsburgh, Pa.—Booth 1118

In attendance: T. C. Miller, H. Henggi.

Exhibiting: Silent check valves. Vacuum controlled check valve for use with compressors will be featured.

MILWAUKEE ELECTRIC TOOL CORP., 5316 W. State St., Milwaukee 8, Wisc.—Booth 215

In attendance: G. E. Heaston, M. E. Halvorsen, L. T. Morand, J. R. Wanie, T. D. Langdon.

Exhibiting: Complete line of electric tools. "Sawzall' electric hacksaw, and right angle drills for spot drilling and "Selfeed" bits for big hole boring. New Pittsburgh lock hammer will be featured.

MILWAUKEE GAS SPECIALTY CO., 730 N. Jackson St., Milwaukee 1, Wisc.—Booths 864, 868

In attendance: John H. Thornbery, Vern C. Kitzrow, Don R. Weidenfeller, W. G. Fetter, R. E. Johnson, E. O. Abel, J. H. Muth.

Exhibiting: Automatic safety pilots, automatic gas control systems, gas appliance ignition systems. Electric igniter, magnetic valves, and 100 percent shut-off switches will be featured.

MILWAUKEE VALVE CO., subsidiary of CONTROLS CORP. OF AMERICA, 2375 S. Burrell St., Milwaukee 7, Wisc.—Booth 655

In attendance: Walter Ellingboe, Tom French, Carl Rowe, Jim Bonga, H. Welch.

Exhibiting: Brass gate, globe, check, angle and needle valves and brass headers and distributors.

MINNEAPOLIS-HONEYWELL REGULATOR CO., 2753 Fourth Ave., S., Minneapolis 8, Minn.—Booth 917

In attendance: *Residential Division*—K. L. Wilson, Karl W. Schick, Walter Baak, H. C. Carlsen, Richard M. Locke, Russel N. Keppel, S. C. Marshall, John P. McCardle, Leo C. McRoberts, T. A. Reed, John Park, C. C. Cochran. *Commercial Division*—John Haines, James S. Locke, J. F. Cummiskey, Robert E. Hall, R. H. Jacobs, Ralph W. Crysler, E. F. Snyder, V. Dale Wissmiller, C. W. Procter, Jr., Douglas K. Ridley, H. R. Canoyer, L. B. Belford.

Exhibiting: *Residential Division*—Residential air conditioning and heating controls: thermostats, control panels and relays including new "R447" heavy-duty switching relay; residential zone controls for both warm air and "wet" heating systems, including new "M-829" zone damper control system; new "L 8024" combination aquastat-relay for "wet" heating system control; residential flame safeguards; gas primary controls; oil controls; and appliance controls, including "V5157 Adatrol-Modusnap." *Commercial Division*—New high velocity, double duct air blender valve; new "Supervisory Data Center" control panel; new electronic air cleaner; and complete line of electric, pneumatic and electronic controls for commercial and industrial buildings.

MITCHELL MFG. CO., 3200 W. Peterson Ave., Chicago, Ill.—Booth 754

In attendance: Robert H. Lodge, Robert Sheridan, Howard G. Haas, Walter F. Zale, E. Mankowski, F. Scive.

Exhibiting: Residential and commercial air conditioning equipment. "Compax" air cooled residential air conditioner, a new self contained unit that requires only an electrical connection and no refrigerant piping, will be featured, with a 4 hp model on display.

MODINE MFG. CO., 1500 DeKoven, Racine, Wisc.—Booth 854

In attendance: C. C. Wilson, Owen Desmond, M. J. Druse, B. J. Speith, S. Svoboda, H. Clark, K. Wennik.

Exhibiting: Steam, hot water, and gas fired unit heaters; convector radiators; cabinet unit heaters; air conditioners, gas-fired duct furnaces.

MONARCH MFG. WORKS, INC., 2501 E. Ontario St., Philadelphia 34, Pa.—Booth 1136

In attendance: E. B. Frame, J. M. Carroll, J. C. Underwood, C. E. Fink.

Exhibiting: Oil burner nozzles, oil burner accessories, water spray nozzles, corrosion resistant sprays.

MOORE CO., THE, 424 Nichols Rd., Plaza Station, Kansas City 12, Mo.—Booths N-444, N-543

MORRISON PRODUCTS, INC., 16816 Waterloo Rd., Cleveland 10, Ohio—Booth 936

In attendance: Thompson Morrison, Hunter Morrison, Jr., Al Galaba, W. H. Tonner, R. W. Leverenz.

Exhibiting: Complete assemblies and component parts of belt drive and direct-connected blowers. Unit drive and "SW" line of blowers will be featured.

MORRISON STEEL PRODUCTS, INC., 601 Amherst St., Buffalo 7, N. Y.—Booths 610, 614

In attendance: L. Hine, W. Duffy, D. Grant, O. Berg, M. Strach, J. Hayes, S. Morrison, M. J. Kohnstamm, C. O. Rainey, A. Swartzmiller, M. Davies, S. Neide, O. Waite.

Exhibiting: Oil and gas "Mor-Sun" furnaces; air cooled and water cooled "Mor-Sun" central air conditioning units, first showing of complete 1957 line. New models of furnaces will be introduced.

MORTON ENGINEERING SERVICE, PAUL S., 609 Bangor Rd., Lawrence, Mich.—Booth 721

In attendance: Paul S. Morton, Mrs. Paul S. Morton, Warren H. Carrington, Mrs. Warren H. Carrington.

Exhibiting: Btu calculator, area and volume calculators (air change method), Btuh calculator, area and crackage calculators (crackage method). New wage withholding tax calculators and new electrical (Kwhr) heat load calculator will be featured.

MUELLER CLIMATROL, 2005 W. Oklahoma Ave., Milwaukee, Wisc.—Booths 955, 965, 969

In attendance: H. P. Mueller, H. P. Mueller Jr., F. J. Nunlist, D. Davidson, E. Scheck, R. B. Schmidt, W. Sutherland, L. Miles, G. Hase, W. Crooker, O. Ress, E. Hill, P. Carter.

Exhibiting: Heating and air conditioning equipment. Blower coil unit, horizontal self contained air conditioner, recessed year 'round air conditioner, and highboy line will be featured, and display will mark the exhibitor's 100th anniversary.

MUELLERMIST IRRIGATION CO., 2612 S. Ninth Ave., Maywood, Ill.—Booth 211

In attendance: D. Edward Wright, Daniel E. Wright, Melvin Miller, Victor Gaddis, Martin Lynch, Ivan Leininger.

Exhibiting: "Fanjet" evaporative roof cooling system.

MULTI-VENT DIV.—see PYLE-NATIONAL CO.

MUNCIE GEAR WORKS, INC., MARVAIR DIV., Muncie, Ind.—Booth 1215

MYERS & BRO. CO., THE, F. E., 249 Orange St., Ashland, Ohio—Booth 230

MYSTIK ADHESIVE PRODUCTS DIV., CHICAGO SHOW PRINTING CO., 2635 N. Kildare Ave., Chicago 39, Ill.—Booth N-342

NATIONAL HEATER CO., INC., 2475 Doswell Ave., St. Paul 8, Minn.—Booth 1137

In attendance: D. S. Anderson, R. C. Black, G. T. Costello, R. J. Crouse, George Hatch, Whitney M. Kerr, E. W. Klein, Myron Koffman, Arnold A. Kosarin, Basil A. Kosarin, Frank S. Lappin, John A. Moore, J. L. Myers, A. L. Nicholls, P. Palmer, Herman A. Pietsch, D. L. Robb, S. F. Stewart, E. M. Tarnoff, W. Wilkinson.

Exhibiting: "National Champion" direct fired heaters, and "Therma-Flo" suspended units and duct heaters and counterflow heaters, all for oil and gas. The new suspended heater blower units and duct heaters, as well as the counterflow units, will be featured.

NATIONAL UNION ELECTRIC CORP.—see ARMSTRONG FURNACE CO.

NATIONAL-U.S. RADIATOR CORP., CYCLOTHERM DIV., 157 E. 1st St., Oswego, N. Y.—Booth 551

NATIONAL-U.S. RADIATOR CORP., DRAYER & HANSON DIV., Los Angeles 54, Calif.—Booth 811

NATIONAL-U.S. RADIATOR CORP., HEATING & AIR CONDITIONING DIV., 221 Central Ave., Johnstown, Pa.—Booths 802, 803, 811

In attendance: C. M. Baumgardner, F. S. Hudson, Jr., J. W. LeRoy, J. W. Hall, C. J. Philage, R. O. Shelkey, R. A. Hazell, S. Wolpert, R. L. Standaert, C. H. Reed, F. S. Barr, F. L. Brown, W. S. Hendricks, C. J. Regan, S. Sackol, R. B. Skipton, L. A. Smith, R. Walker, V. W. Blackney, S. Moroh.

Exhibiting: Gas boilers, oil heating units, cast iron and steel; all-fuels boilers, cast iron; "National-U.S. Packets," all-in-one home heating units; commercial steel boilers; "Queen of Scots" scotch marine boilers, cast iron and non-ferrous baseboard, cast iron and non-ferrous convectors; cast iron "Sunray" radiators;; new fin tube radiation; air conditioning equipment for residential and commercial use. "National-U.S. Packet —Mark III"; "Commander" residential steel gas heating unit; "47" series cast iron oil heating unit; "Sunray" cast iron baseboard; "Floorline" non-ferrous baseboard; new fin tube radiation; "Premier" cast iron oil heating unit; "Sentinel" steel oil heating unit; "Deluxe" gas boilers; and "Queen of Scots" scotch marine boilers will be featured.

NATIONAL-U.S. RADIATOR CORP., VIKING AIR PRODUCTS DIV., 601 Walworth Ave., Cleveland 2, Ohio—Booth 549

NATIONAL-U.S. RADIATOR CORP.—also see PACIFIC STEEL BOILER DIV.

NELSON DIV., HERMAN—see AMERICAN AIR FILTER CO., INC.

NEW CASTLE PRODUCTS, INC.—see AIR-DOOR INC.

NEW YORK AIR BRAKE CO., THE, KINNEY MFG. DIV., 3529 Washington St., Boston 30, Mass.—Booths 1155, 1159

NEW YORK AIR BRAKE CO.—also see AURORA PUMP DIV.

NEW YORK BLOWER CO., THE, 3155 S. Shields Ave., Chicago 16, Ill.—Booths 325, 327

In attendance: E. E. Trickler, Bill Mathis, Bruce D. Shellstrom, Clifford Culpepper, Neil S. Booth, Fred X. Nicholson, Scott F. Rost, Joel E. Fitts, Fred C. Zimmerman, Jack B. Wakeman.

Exhibiting: New line of centrifugal heaters, new power roof ventilators, general purpose centrifugal fan, heavy duty Class III centrifugal fan, unit heaters, wholesaler and distributor items. New sectional heating and ventilating units, high pressure centrifugal fan, new "Bell-Ex" centrifugal power roof ventilator, and new "VP-Ex" propeller type power roof ventilator will be featured.

NIAGARA BLOWER CO., 405 Lexington Ave., New York 17, N. Y.—Booth 8

In attendance: Paul H. Schoepflin, W. L. Offenhamer, O. F. Gilliam, R. C. Knight, R. M. Magner, J. E. Douglas, N. L. Baker, G. D. Warriner, N. B. Ward, I. F. Delehanty, B. M. Barnitz, E. M. Thompson, A. S. Leonard, R. S. Jones, D. B. Devendorf, S. O. Shashinka, Clarence Moss.

Exhibiting: "No Frost" space coolers, "Hygrol" air conditioner, high pressure steam fan heater. New equipment in the air conditioning and heat transfer specialty field will be featured.

NIAGARA FURNACE DIV., THE FOREST CITY FOUNDRIES CO., 2500 W. 27th St., Cleveland 13, Ohio—Booths 1042, 1044

In attendance: I. E. Seith, Robert Fritz, James Harrison, Wm. Spaine, Edward Mead, Otto Zeman.

Exhibiting: Gas and oil fired warm air furnaces, residential air conditioning equipment. Builders' models of gas-gravity and gas forced air furnace will be featured.

NIAGARA MACHINE & TOOL WORKS, 637-697 Northland Ave., Buffalo 11, N. Y.—Booths 1109, 1111

In attendance: F. A. Reed, H. E. Carson, L. L. Hock, Joseph Selan, Robert Mahaney, Robert Gaylord, W. McKale. Also W. J. Silberman of Republic Metals; and W. M. Ward, A. P. Schneider, and Norman Martin of Ward Machinery Co.

Exhibiting: 2 x 36 slip roll, combination machines, hand tools, 30 in. bar folder, lever punch and shear, ring and circle shear, 3 x 48 in. power roll, 48 in. foot shear, air power notching and punching machine, universal power grooving machine, power table, foot brake. Although previously announced, the air power notcher and the modernized universal power groover will be exhibited for the first time.

NORMAN PRODUCTS CO., 1150 Chesapeake Ave., Columbus 12, Ohio—Booths N-231, N-233

In attendance: J. C. Booton, R. G. Millikan, E. A. Norman, N. G. Campbell, E. C. Johnson, N. R. Foloky.

Exhibiting: "Southerner" horizontal, duct furnace, residential conversion burner, industrial conversion burner. "Three-Sixty" sealed combustion system, gas fired overhead forced convection heater with electric ignition system, will be featured.

NYE TOOL CO., 4120 Fullerton Ave., Chicago 39, Ill.—Booth 1237

In attendance: A. A. Erickson, Joseph Nischan, Charles Oddsen, Walter Fuller, Walter Pastryk, Harold Jorpeland.

Exhibiting: Pipe tools.

OLIN MATHIESON CHEMICAL CORP., East Alton, Ill.—Booth N-309

In attendance: U. R. Jaeger, Ken Stover, R. E. Bockhorst, N. Keith, H. Grote, P. Brett.

Exhibiting: Evaporator panels and heat exchanger components.

OLIN MATHIESON CHEMICAL CORP., — also see RAMSET FASTENING SYSTEM

OLSEN MFG. CO., THE C. A., Elyria, Ohio —Booths 832, 933

OMARK INDUSTRIES, 5001 S.E. Johnson Creek Blvd., Portland 6, Ore.—Booth N-328

In attendance: Fred L. Catiller.

Exhibiting: "Drive-It" powder actuated tools, hammer drive tool line.

ORR & SEMBOWER, INC., Morgantown Rd., Reading, Pa.—Booth 10

In attendance: F. H. Klein, W. B. Firman, E. A. Burt, H. T. Schladitz, V. N. Decerchio, P. E. O'Hora, L. A. Roethe, R. C. Currie, H. J. Todd, W. P. Williams, S. D. Distelhorst.

Exhibiting: "Powermaster" and "Power-Pak" automatic boilers; "O&S" fuel burning systems.

OWENS-CORNING FIBERGLAS CORP., Toledo 1, Ohio—Booth 217

PACIFIC STEEL BOILER DIV., NATIONAL-U. S. RADIATOR CORP., 944 Ash St., Johnstown, Pa.—Booth 810

In attendance: T. B. Focke., C. M. Baumgardner, E. J. Grady, H. M. Gibb, E. F. Hackett, W. E. Everham, W. D. Braden, J. A. Hallinan.

Exhibiting: Scotch type boiler-burner unit, "Lo-Set" boiler-burner, plate flue boiler-burner unit, "Built-on-the Job" boilers.

PARAGON ELECTRIC CO., 1600 Twelfth St., Two Rivers, Wisc.—Booth 544

In attendance: Warren A. Petersen, John H. Otis, Wm. C. Leff.

Exhibiting: Time controls.

PATTEN CO., J. V., 550 DeKalb Ave., Sycamore, Ill.—Booth 845

In attendance: Don C. Patten, John H. Patten, Wallace Landau, S. R. Roberts, J. F. Helminger, Carl W. Kimball, Don Holverson.

Exhibiting: Oil fired and gas fired residential heating equipment; combination heating-cooling units; residential cooling equipment, air or water cooled. New line of air cooled, self-contained, suspended type central air conditioning units for attic or basement wall installation, in three sizes (17,000, 22,000, and 38,000 Btu per hr); and new "DeLuxe" line of oil or gas fired warm air furnaces with streamlined front closures will be featured.

PATTERSON-KELLEY CO., INC., THE, 105 Warren St., East Stroudsburg, Pa.—Booth 859

In attendance: Charles E. Drake, John A. Clark, Frank Lankow, Frank J. Thoma.

Exhibiting: Type "DW" water-to-water heat exchanger, copper lined storage water heater, "Type FO" internal fin "Freon" chiller.

PEERLESS CORP., THE, Ludlow Ave., Indianapolis 7, Ind.—Booth 555

In attendance: O. U. Mutz, H. W. Mutz, T. R. Mutz, D. H. Williams, R. C. Whallon, T. Z. Clifford.

Exhibiting: "Clima-Pump" air source heat pump, "Clima-Twin Aire" air cooled air conditioners, "Versat-All" gas and oil warm air furnaces. The heat pump for year 'round heating and cooling in a single all-electric unit will be featured.

PEERLESS ELECTRIC CO., THE, 1401 W. Market St., Warren, Ohio—Booth 607

In attendance: Walter A. Curtis, Lester C. Mills, Robert E. Lininger, Richard Thompson.

Exhibiting: Fans, blowers and ventilating equipment, and featuring new centrifugal roof ventilator.

PEERLESS OF AMERICA, INC., 5830 N. Pulaski, Chicago 30, Ill.—Booth 751

PEERLESS PUMP DIV., FOOD MACHINERY AND CHEMICAL CORP., 2005 Northwestern Ave., Indianapolis, Ind.—Booth 1219

PENN CONTROLS, INC., Goshen, Ind.—Booth 1025

In attendance: Carlos Morgan, Harold Gray, Jim Moravec, F. X. Fessler, L. J. Krause, Wm. Bowen, R. H. Luscombe, K. W. Cash, A. Boyd Ralph, P. O. Penn, R. L. Ratliff, Don Peters, Jud Forbes, Gene Price, A. W. Barr, Ed Corbett, George Sanders, James Garrett, Frank Halloran, Richard Young, Harold King, Ken Fisher, D. F. Belknap, Ivan Stepnich, Emile Tassin, Gordon Manista, O. E. Johnsonbaugh, Frank Goulding, R. S. Penn, Wm. Few, Howard Shilling, Al Walter, Jim Kinney.

Exhibiting: Automatic controls for heating, air conditioning and cooling. New oil burner stack, switch; new thermostat (heating, cooling, air conditioning); new warm air controls; and new hot water controls will be featured.

PENNSYLVANIA FURNACE AND IRON CO., Pine at Fourth, Warren, Pa.—Booths 128, 130

PERFECTION INDUSTRIES DIV. OF HUPP CORP., 1135 Ivanhoe Rd., Cleveland, Ohio—Booths 1149, 1151

In attendance: Carl W. Millsom, Wm. H. Smith, H. C. Erhard, Marion Miller, Allen B. MacLaren, Fred Stahl, Glenn Crowner.

Exhibiting: Oil and gas fired forced warm air furnaces, "Tuckaway" self-contained attic cooling units, air-cooled residential and commercial cooling units. The self-contained attic cooling units will be featured.

PEROLIN CO., INC., THE, 1112 W. 37th St., Chicago 9, Ill.—Booth N-418

In attendance: H. R. Strong, W. H. Carls, S. J. Wazuicki, Paul E. Stern, C. D. Hutchinson.

Exhibiting: "Formet" water system treatment, algae preventive, dry acid cleaner, fuel oil treatment. Crystals for the elimination of scale and corrosion in air conditioning systems and/or hot water systems will be featured.

PETRO, DIV. OF IRON FIREMAN MFG. CO., 3170 W. 106th St., Cleveland 11, Ohio —Booth 125

In attendance: Jess R. Crews, W. J. Hegan, C. E. Bailey, G. T. Kaufman, G. A. Mattinik, J. F. O'Donnell, N. Kaptain, G. A. Moore.

Exhibiting: Packaged domestic boiler, rotary burner with air register, glass lined oil fired water heater, pressure burner for No. 5 oil, combination gun burner for gas and light oil, forced draft combination gun burner.

PHILLIPS DRILL CO., U. S. 12-Liberty Trail, Michigan City, Ind.—Booth N-421

In attendance: R. F. Dieterich, J. F. Wagner, M. J. Sepanski.

Exhibiting: Self-drilling expansion shells; electric motor hammers. New trade name and promotion program will be featured.

PITTSBURGH PLATE GLASS CO., FIBER GLASS DIV., 1 Gateway Center, Pittsburgh 22, Pa.—Booths 1247, 1249

In attendance: Orville Miller, Jr., R. R. Pryor, R. M. Hoffman, J. M. Collins, E. D. Kobilis, R. F. Siefert.

Exhibiting: Air filters, air conditioner filter pads, fiber glass pipe insulation, fiber glass duct liner, fiber glass duct wrap. New fiber glass air conditioner filter pad, "one size fitting any type of air conditioner", and new fiber glass one-piece pipe insulation, will be featured.

PITZ FOUNDRY, INC. — see AMERICAN HYDROVAC DIV.

PLIBRICO CO. — see INSUL-LYTE CORP. DIV.

PLUMBING, HEATING, AIR CONDITIONING WHOLESALER, 92 Martling Ave., Tarrytown, N. Y.—Booths 1239, 1241

Exhibiting: Publication.

PLUMBING & HEATING BUSINESS, 130 E. 59th St., New York 22, N. Y.—Booth 411

Exhibiting: Publication.

PORTABLE ELECTRIC TOOLS, INC., 320 W. 83rd St., Chicago 20, Ill.—Booth N-211

In attendance: John Baker, George W. Weatherby, Dick Bigelow, Howard R. Arnold, Ross Norton, Wm. Rosenstiel, John Tracy.

Exhibiting: ¼, ⅜ and ½ in. portable electric drills; jig saw; electric trimmer; grinders; impact wrench ½ in. sq dr; 5½ in. saw; 6¼ in. safety clutch saw; 6½ in. automatic clutch saw; orbital sanders; drill kits; "Spin-a-Brush" paint brush cleaner. New model impact wrench, automatic safety clutch saws, and electric trimmer will be featured.

PORT CITY MACHINE & TOOL CO., 3590 Airline Rd., Muskegon, Mich. — Booth N-410

In attendance: Carl A. Johnson, Jr., Harry E. Gibson.

Exhibiting: "Mipatan" electric hammer, "Mipatan" pneumatic hammer.

POTTER & BRUMFIELD, INC., Princeton, Ind. — Booth 314

POWDER TOOL SALES CO., 5349 W. Madison, Chicago, Ill.—Booth N-328

POWER-FLAME DIV. — see SIEMON MFG. CO.

POWERLINE FAN CO., DIV. CHELSEA PRODUCTS, INC., 639 South Ave., Plainfield, N. J.—Booth 744

In attendance: G. J. Read, A. E. Ott, J. Sutton, J. Wolfe, J. Prete, R. Van Atta, L. Yale.

Exhibiting: Industrial fans, blowers, ventilation equipment and accessories.

POWERS REGULATOR CO., THE, 3400 Oakton St., Skokie, Ill.—Booths 944, 1045

In attendance: H. C. Mueller, J. W. Powers, K. M. Stevens, F. A. Murray, D. Ladd, C. A. Gustafson, A. J. Keating, D. H. Thorburn, E. R. Bowman, T. J. Smith, J. C. Scott, W. L. Doty.

Exhibiting: "Flowrite" diaphragm valves, packless radiator valves, heating-cooling thermostats, "Powerstroke" damper motors, hygrostats, static pressure regulators, remote bulb thermostats, dial thermostats, indicating regulators, recording-controlling regulators.

PRAT-DANIEL CORP. — see THERMOBLOC DIV.

PREMIER FURNACE CO., Dowagiac, Mich.—Booth N-311

In attendance: Dick Judd, Bernie Lagerborg, Ralph Waldo, Joe Ruetty, Dick Houden, Dick Wallerstedt.

Exhibiting: Year around air conditioners, "Fan-Air" baseboard diffusers, introducing the 1957 improved line.

PRICE & RUTZEBECK, P. O. Box 30, Hayward, Calif.—Booth N-433

In attendance: John D. Rutzebeck, William A. Crosbie, Ben Richard, Warren Frenell, Jack Battelle, Ray Grimes, Joe Capen, Sam Barnett, Charles Mangieri, Earl T. Peck.

Exhibiting: "Planetor Magic Feed" boring bits, "Grips Rite" angle heads, "Handy" angle saws.

PRIMOR PRODUCTS DIV., BORG-WARNER CORP., 2011 W. Beecher Rd., Adrian, Mich. —Booth 768

In attendance: T. H. Smoot, R. M. Herbert, A. D. Rumsey, D. C. Bellman.

Exhibiting: Air cooled and water cooled central air conditioning equipment; air cooled and water cooled chillers, evaporators, condensers. 1¾ and 5 hp air cooled hermetic units and 2, 3 and 5 hp propeller fan condensing units will be featured.

PRITCHARD AND CO., J. F., OF CALIFORNIA, 4625 Roanoke Pkwy, Kansas City 12, Mo.—Booth N-343

In attendance: Karl E. Johnson, W. R. Roeyer, Hugh Robertson, Richard Brent, B. B. Farmer, Glen H. Collins, George Westall, John Sears, R. J. Clark, Fred Richeda, Louis B. Hoffman, Harry B. Hoffman, Vance A. Morrow, T. E. Machie, W. L. Woodall, Gordon Morrow, J. L. Brownlee, R. L. Craig, J. I. Marquard, William Bodle, B. E. Anderson.

Exhibiting: "LoLine" cooling tower, series B and series R, the first being greater in height and with greater capacity for air conditioning and water cooling for industrial processes.

PROPORTIONEERS, INC. — see B-I-F INDUSTRIES, INC.

PROX CO., INC., FRANK, 1201 S. First St., Terre Haute, Ind.—Booth 127

In attendance: C. R. Goodrich, J. B. Hutchison, Carl Penningroth, Jr., A. D. Parish.

Exhibiting: Cast iron sectional boiler.

PULLMAN VACUUM CLEANER CORP., 25 Buick St., Boston 15, Mass.—Booth 973

In attendance: Edgar A. Green, Robert J. Berns, Norman Ruby, Lin Krause.

Exhibiting: Furnace cleaners. A "Neverclog" bag that has been used in 4000 cleanings will be featured, and there will be a special "vacuum box" filled with paper money, visitors being asked to guess the correct amount.

PYLE-NATIONAL CO., THE, 1334-58 N. Kostner Ave., Chicago 51, Ill.—Booths 1058, 1060

In attendance: R. S. Geocaris, R. K. Sherman, R. A. Meck, L. W. Burns, F. R. Grysik, W. E. Wagner, R. W. Ritsel.

Exhibiting: Air diffusers, "Multi-Vent," combination lighting fixture and air diffuser. New "Multi-Vent" troffer will be featured.

QUALITY SPECIALTY CO., INC., 28th St. & Lincoln Ave., Camden 5, N. J.—Booth N-413

In attendance: Carl Jay, Jules Jay, Bernard Jay, Thomas J. Cumming, Sidney Schwartz, Morris Portnoy.

Exhibiting: "Q S Ventilo" control valves, "Q S" purge and balancing valves, automatic air vents and vacuum breaker and tank drain combination.

QUICKDRAFT CO., P. O. Box 87, Canton, Ohio—Booth 717

QUINCY STOVE MFG. CO., THE, 825 S. Front St., Quincy, Ill.—Booth 247

In attendance: Herman D. Tow, K. W. Fischer, Chas. F. Bahr, Henry L. Hudson, Dean Gilchrist, Frank Conklin, Allan Swartzmiller, Eugene Brown, Wm. L. Rector, Al DuRant.

Exhibiting: "Monogram" wall and recessed heaters (oil and gas). Forced air high-boy and counterflows, and low-boy model (oil and gas), will be featured.

QUINCY STOVE MFG. CO., THE, RADIANT-AIRE DIV., 825 S. Front St., Quincy, Ill.—Booth N-214

In attendance: W. F. Shaughnessy, Dean Gilchrist, Herman D. Tow, Chas. F. Bahr.

Exhibiting: Oil and gas warm air furnaces — hi-boy, counterflow, low-boy. Assets of Radiant-Aire Corp. have been purchased by Quincy Stove, and this is the first showing of Radiant-Aire products manufactured by Quincy.

R. C. S. TOOL CORP., 227 E. Front St., Bloomington, Ill.—Booth 1038

In attendance: T. M. Sweeney, J. A. Kinsella, H. G. Johnson, W. D. Bogh.

Exhibiting: "Super Saw" portable all purpose power saws for roughing-in work; attachment for ¼ in. heavy duty electric drills, "Super Saw" blades. "SuperSaw" model 250 integral unit, with self contained electric motor, will be featured.

RADEX CORP., 2076 Elston Ave., Chicago 14, Ill.—Booth N-505

In attendance: R. R. Cook, R. C. Black, G. T. Seil, M. J. Kaufman.

Exhibiting: "Dustronic" electrostatic precipitators, "Dustronic" air circulator, "Smog-Free" air cleaners.

RADIANT-AIRE DIV. — see QUINCY STOVE MFG. CO., THE, RADIANT-AIRE DIV.

RADIANT UTILITIES CORP., 8817 18th Ave., Brooklyn 14, N. Y.—Booths 1128, 1130

In attendance: Arthur A. Marcus, Julius S. Goldberg, Joseph Bloom.

Exhibiting: Oil burners, oil and gas fired water heaters, sump pumps, submersible sump pumps, laundry tray pumps, Gas water heater will be featured.

RADIO CORP. OF AMERICA, COMMERCIAL ELECTRONIC PRODUCTS, Camden 2, N. J.—Booth N-208

RAMSET FASTENING SYSTEM, 12117 Berea Rd., Cleveland 11, Ohio—Booth N-447

In attendance: C. Tryon, D. Moller, A. Masters, R. Kopf, J. Schwaller.

Exhibiting: Powder actuated tools; "Shure-Set" hammer-in fastening tool.

RANCO INC., 601 W. Fifth Ave., Columbus 1, Ohio—Booth N-347

In attendance: R. W. Bartholomew, C. E. Boren, E. V. Dunbar, H. M. Goldberg, C. J. Hasbrook, C. V. Haueisen, A. C. Homeyer, H. M. Laird, James Manecke, J. D. Merkle, F. G. Slagel, C. M. Spielman, M. S. Vidis, B. H. Weber, C. E. Whipps.

Exhibiting: Commercial controls, pressure and temperature operated for compressor and unit application; and smaller sized controls, pressure operated only, for panels used on central heating and cooling systems. Bypass valves and reversing valves for 1 to 2 ton window unit application, and larger capacity reversing valves for 3 to 7 ton packaged air conditioning units for both heating and cooling that are solenoid operated and automatic in change over. Temperature controls for window air conditioner units for automatic cycling; fan operation with an auxiliary switch attached to outside cycling control case or with fan switch incorporated inside the control cover; and controls for deicing or defrosting air conditioning units, whether window type or larger tonnage units, will be featured.

RANDALL GRAPHITE BEARINGS, INC., Greenlawn & Lake Sts., Lima, Ohio—Booth 310

In attendance: W. E. Dickerson, K. W. Strunk, Ray Chaney, Charles Esch, Jack Van Buskirk, Carl Peterson, Harry Koeckritz, Howard Dickerson, Jerry Miller, R. W. Baggott.

Exhibiting: Bronze sleeve bearings and pillow blocks. Duplex bearing assembly will be featured.

READY-POWER CO., THE, 11231 Freude Ave., Detroit 14, Mich.—Booth 1145

In attendance: H. D. Gumpper, W. S. Jewell, N. K. Hall, Charles E. Berlin, G. Hicks Edwards, E. P. Schumaker, Arthur R. Seidel, F. E. Hayden, William Wendt.

Exhibiting: Natural gas engine driven compressor air conditioning unit, which is fully automatic with modulating operation of speed and cylinder loading and unloading.

RECOLD CORP., 7250 E. Slauson Ave., Los Angeles 22, Calif.—Booths N-506, N-507

In attendance: H. T. Jarvis, D. D. Wile, E. V. Jarvis, H. L. Quinn, S. Singer, Hal Jarvis.

Exhibiting: Multizone air conditioners with 40 sq ft and 6.6 sq ft face areas; "Dri-Fan" evaporative condensers with modulating dampers; steam, water and DX coil air conditioning surface, and ceiling blower coils with "Vapomatic" low temperature defrosting system. Modulating dampers for evaporative condenssers, controlled by a thermostat in the condenser water to regulate amount of air through the condenser and keep water temperature constant, will be featured.

REDMOND CO., INC., Monroe St., Owosso, Mich.—Booth 1068

In attendance: J. W. Tweedy, M. J. Koenig, R. Burns, R. Batchelor, H. Mulbar, J. Pichiotino, A. Rozema, R. MacKenzie, R. Curtis, K. Heiberg, E. Gnther.

Exhibiting: Complete line of fractional horsepower electric shaded pole motors, and blowers.

REFLECTAL CORP., SUBSIDIARY OF BORG-WARNER CORP., 310 S. Michigan, Chicago 4, Ill.—Booth 229

In attendance: R. E. Runcan, E. D. Foster.

Exhibiting: "KoolShade" sun screen.

REFRIGERATION & AIR CONDITIONING CONTRACTORS ASSN., 228 N. LaSalle St., Chicago 1, Ill.—Booth N-243

REFRIGERATION APPLIANCES, INC., 923 W. Lake St., Chicago 7, Ill.—Booth N-422

In attendance: E. Niederer, Frank A. Klaas, Don Niederer, H. W. Morgan, Don Croeger, E. H. Niederer.

Exhibiting: Air cooled condensers, "Comfort Master" air handling units, "V" bank furnace bonnet coils, downdraft residential air conditioning coils, horizontal residential air conditioning coils.

RELIANCE ELECTRIC AND ENGINEERING CO., 1088 Ivanhoe Rd., Cleveland 10, Ohio —Booths N-213, N-215

In attendance: R. O. Herbig, R. P. Weimer, K. E. Carter, M. F. Schlenker, J. O'Keefe, T. J. Lisy, J. M. Biggar, C. F. Hill, E. S. Whitlock, G. E. Zorini, D. L. Prowse, M. Sarley, A. G. Conway, D. K. Bogart.

Exhibiting: Part winding start motor (feature display) design to reduce inrush currents cheaply; air-over a-c motor; self-cooled motor, operating in fan air stream, d-c motor, largely used on air conditioned railroad cars and reefers; complete line of totally protected a-c motors; "Reeves" motor pulley, variable speed for pump applications.

REMINGTON ARMS CO., INC., 939 Barnum Ave., Bridgeport 2, Conn.—Booth N-338

In attendance: C. J. Turner, A. G. Lane, B. L. Warnes, D. D. Doerge.

Exhibiting: Stud driver, model 455, "Mighty-Mite" stud driver, Model 456.

RESEARCH PRODUCTS CORP., 1015 E. Washington Ave., Madison, Wisc.—Booths 1024, 1026

In attendance: P. N. Dutton, G. H. Piering, H. E. Whelpley, J. E. Walz, C. B. Rowe, E. F. Rothe, D. O. Bender, K. H. Lindquist, J. M. Roudebush, F. W. Carlstrom, V. Hellenbrand, Nort Krohn.

Exhibiting: "Aprilaire" automatic electric humidifier, industrial and domestic; "E Z Kleen" air filters, grease filters; paint arrestors; "Coolpad"; formed elements. The automatic electric humidifier will be featured.

REVCOR, INC., 251 Edwards St., Carpentersville, Ill.—Booth 116

In attendance: John Reichwein, Joseph Kochevar, R. F. McCall, R. I. Trumble, M. J. Fabbri, Tony Casade, Don E. Arnold, John Jubell, Dave Jubell.

Exhibiting: "Blastaire" and "Revcor" blower wheels, blower wheel housings. New design double inlet blower wheels featuring single center disc to reduce weight will be featured.

RHEEM MFG. CO., 7600 S. Kedzie Ave., Chicago 29, Ill.—Booth 826

In attendance: J. L. Hover, R. Gilbert, P. Fetzek, J. Brownell, J. Houston, J. Curfman.

Exhibiting: Residential heating and air conditioning equipment; commercial air conditioning units, room coolers; "Economy" attic air conditioning units. Glass lined furnace line, new furnace line designed for cooling, new "Rheemaire" air conditioning units, and new commercial air conditioning units will be featured.

RHEEM MFG. CO. — also see RICHMOND PLUMBING FIXTURES DIV.

RICHMOND PLUMBING FIXTURES DIV., RHEEM MFG. CO., P. O. Box 111, Metuchen, N. J.—Booth 307

In attendance: John J. Hall, George B. Chandless, Jr., V. B. Churchill, F. Leonhardt, L. S. Maehling, E. C. Riley, E. L. Wolf.

Exhibiting: Complete line of boilers, warm air conditioners, and cooling units. "Budgeteers" with extended jackets will be featured.

RIC-WIL INC., 24 Brown St., Barberton, Ohio —Booth 508

In attendance: N. L. Mooneyham, W. F. Wood, E. S. Pandy, C. G. Van Schoor.

Exhibiting: Prefabricated insulated pipe units.

RIDGE TOOL CO., THE, 400 Clark St., Elyria, Ohio—Booths 665, 667, 669

In attendance: Walt Miller, Carl Petersen, Milo Sharp, L. C. Richardson, W. L. Parcell.

Exhibiting: Complete line of "Ridgid" pipe tools including pipe wrenches, vises, reamers, cutters, threaders, pipe and bolt threading machines, power drives and accessories. New tools to be featured include "535" pipe and bolt threading machine, "4PJ" geared threader, "65R-TC" threader, wide-roll cutter, tubing cutters.

RITE ENGINEERING & MFG. CORP., 144 S. Mission Rd., Los Angeles 33, Calif.—Booth 1269

In attendance: Eric L. Pridonoff, John E. Kasunich, Del Peterson.

Exhibiting: Water heating boiler, combination gas-oil fired; "Lime-Lite" (built-in heat exchanger) boiler.

RITTLING CORP., THE, Rittling Bldg., Buffalo 5, N. Y.—Booth 1014

In attendance: C. P. Rittling, J. B. Rittling, R. W. Rittling, R. J. Carter, F. W. Helikson, K. King, G. S. McCarthy, N. T. O'Rourke, R. Polasik.

Exhibiting: Baseboard radiation, finned tubing, cabinet convectors, unit heaters, backdraft dampers, unit ventilators, heating and cooling units.

ROBERTS-GORDON APPLIANCE CORP., 44 Central Ave., Buffalo 6, N. Y.—Booth 1115

In attendance: R. I. Warnecke, W. E. Davis, W. L. Wright, R. G. Budden, R. T. Huyck, Richard Palczynski.

Exhibiting: Furnaces—hi-boy and lo-boy, gas or oil; hot water boilers; unit heaters, up to 200,000 Btu; air conditioning, 1¾, 2, 3 and 5 ton, air cooled; residential, commercial and industrial conversion burners up to 10½ million Btu.

ROBERTSHAW-FULTON CONTROLS CO., FULTON SYLPHON DIV., P. O. Box 400, Knoxville 1, Tenn.—Booth 1050

In attendance: L. S. Dysart, E. D. Rogers, G. L. Leupold, J. D. Crum, N. W. Barnes, E. T. Cato, Larry Jones.

Exhibiting: Temperature controls, packless valves, room thermostats, automatic radiator valves, expansion joints, bellows and bellows assemblies.

ROTHERM ENGINEERING CO., INC., 7280 W. Devon Ave., Chicago 31, Ill.—Booth N-416

In attendance: H. S. Kuhn, R. B. Borucki, H. Robarge.

Exhibiting: Revolving joints, expansion joints, and piping compensators, the latter two being featured.

SARCO CO., INC. — SARCOTHERM CONTROLS, INC., 350 Fifth Ave., New York, N. Y. — Booth 569

In attendance: L. Barfus, A. Milnes, H. L. Simmons, T. Robert Stevens, R. L. Stewart, W. H. Worth.

Exhibiting: New "Sarco-Pak" control unit, specialties for steam and hot water heating systems, control systems, fin tube and baseboard radiation, condensate and vacuum pumps.

SCHECTER BROS. CO., Hancock & Huntingdon Sts., Philadelphia 33, Pa.—Booths 1064, 1066

In attendance: Samuel Schecter, Morris Gross, Herbert First, Alan Damaset, Larry Schecter, I. Yasno, C. Roberts.

Exhibiting: Galvanized prefabricated duct, wall stack, and fittings; galvanized furnace pipe and adjustable elbows; perimeter heating fittings and pipe.

SCHNACKE, INC., 1101 N. Governor, Evansville 7, Ind.—Booth N-430

In attendance: F. C. Schnacke, James K. Ellsworth, M. J. Barnett, James E. Russell.

Exhibiting: Compressors, condensing units, 5 to 60 hp; package water chillers, 10 to 120 tons; cooling towers, 3 to 60 tons. Improved 8 cylinder compressor for applications from 30 tons to 60 tons and new type propeller cooling tower (3 to 50 tons) will be featured.

SCULLY SIGNAL CO., 174 Green St., Melrose 76, Mass.—Booths N-230, N-232

Exhibiting: "Ventalarm" signal, "Ventalarm" gage, "Scully" gage, "Unifill" tight delivery connections, "Fair-Safe" monitor, nozzles and swivels for oil delivery, and other devices.

SEALMASTER DIV., STEPHENS-ADAMSON MFG. CO., Ridgeway Ave., Aurora, Ill.—Booth 134

In attendance: Charles B. Hurd, William E. Cousland, Carl King, George Marsh, Richard Glavan, Donald Schroeder.

Exhibiting: Representative line of industrial ball bearing units.

SEQUOIA MFG. CO. and SEQUOIA VACUUM SYSTEMS, 1090 Brittan Ave., San Carlos, Calif.—Booth 131

In attendance: Glenn Barnes, David Lindsey.

Exhibiting: Gas fired warm air furnaces, air cooled central type air conditioners, central vacuum systems. Central built-in vacuum cleaning system, installed by heating-sheet metal contractors, will be featured. The tank-type receptacle with motor is placed in the garage, and pneumatic 2 in. aluminum tubing extends under floors or overhead to desired locations on the floor plan, emerging at floor or low-wall inlet sockets.

SERVEL, INC., 119 N. Morton Ave., Evansville 20, Ind.—Booth 863

In attendance: R. L. Brown, R. E. Davis, A. J. DeFino, R. K. Eskew, G. O. Galloway, R. C. Marbach, L. E. Walbridge.

Exhibiting: 25 ton absorption type water chiller for air conditioning.

SHANA MFG., INC., 188 W. Randolph St., Chicago 1, Ill.—Booths 1138, 1140

SHAW-PERKINS MFG. CO., P. O. Box 285, West Pittsburgh, Lawrence County, Pa.—Booth N-209

In attendance: Howard F. Brenholts, Fred N. McConnell, George P. Baker, Eugene P. Gribble, Edward C. Davies, Jim Eichorst.

Exhibiting: Heating radiators for factories, schools, churches, hospitals, institutions, offices, homes, marine vessels, hotels, and other construction. Panel radiator with top air outlet, panel radiator with front air outlet, panel baseboard radiator (for the home, office or other applications depending on construction), "Perkins Airadiator" (primarily designed for industry), single tube panel baseboard. Heating radiator for mental and penal institutions with box type housing of heavy, closely-perforated steel which covers the interior construction to prevent tampering and insertion of foreign matter will be featured.

SIEMON MFG. CO., POWER-FLAME DIV., 1203 Main, Grandview, Mo.—Booths 743, 745

In attendance: Roland W. Brown, James Davis, Charles Jones, M. J. Murray.

Exhibiting: Power type gas burners, combination gas-oil burners.

SILENT FLAME MFG. CO., INC., Blue Point, L. I., N.Y.—Booth 311

SILVERCRAFT, INC., 130 S. Floyd St., Louisville 1, Ky.—Booth N-443

In attendance: F. C. Lewis, Eugene C. Thompson, Raymond D. Kreger, H. O. Haldeman, John M. Gent, Harold Binder, Thomas Binder, J. Konn, Harry P. Materne, S. A. Maverick, Jr., E. M. Tarnoff.

Exhibiting: "Summer Shower" water cooling towers of the induced draft type "incorporating the use of light weight aluminum and modern coatings plus conveniently located piping and electrical connections." "Power Package" assembly of motor, fan blade and guard into a single power unit will be featured.

SKUTTLE MFG. CO., 150 Summit, Milford, Mich.—Booth 529

In attendance: R. W. Geisler, K. M. Fournier, Edward H. Haugen, J. A. Webster, J. Scannell.

Exhibiting: "Humidimatic" electrically operated humidifier, permanent washable "Electronaire" air filters for furnaces and air conditioners, and "Humidex" tablets for preventing rust and corrosion in humidifiers.

SLANT-FIN RADIATOR CORP., 87-49 130th St., Richmond Hill 18, N. Y.—Booth 439

In attendance: Alvin Buschel, Melvin Dubin, Milton M. Brooks, Lewis Davidson, Robert Sweiger.

Exhibiting: Commercial finned tube radiators, residential baseboard radiation, finned tube for special application. "Steel-Pak" 1¼ in. IPS packaged baseboard; stainless steel, all aluminum, and wrought iron finned tube radiators; and "Low-Line" enclosures will be featured.

SMITH CO., INC., THE H. B., Westfield, Mass.—Booth 707

SMITH CORP., A. O., 3533 N. 27th St., Milwaukee 1, Wisc.—Booths 1108, 1110

In attendance: J. W. Burleson, J. S. Robinson, D. V. Coon, D. D. Williams, C. L. Hewitt, Jr., K. H. Flint, C. R. Thorpe, W. F. Manthei, C. W. Schulz, F. J. Burbank, Walter Bogusz, C. B. Giddings, C. G. Fohey, T. C. King, H. G. Merkel, J. L. Stewart.

Exhibiting: Gas and oil fired warm air home heating units, year 'round home air conditioners, summer air conditioner units and home heating boilers.

SNAPPY INC., 620 W. Main, Detroit Lakes, Minn. — Booth N-320

In attendance: Leroy E. Anderson, Ray Powers, Ken Swift, Walt Nash.

Exhibiting: Furnace fittings, take-offs, drawbands. Pipe connectors and sheet metal hole cutter will be featured.

SNIPS, 5707 W. Lake St., Chicago 44, Ill.—Booth N-245

SOUTHWEST MFG. CO., 141 S. Elliott, Aurora, Mo.—Booths 226, 228

In attendance: B. T. Church, Leonard Bisby, Edward Marcum, John McCormick, Wayne West, Chas. A. Dillon, Joe Fisher.

Exhibiting: Gas fired furnaces—forced air; hiboy, loboy, horizontal, counterflo; gas fired floor furnace and recessed wall heaters; add on 2, 3 and 5 ton air-cooled condensers, evaporative coolers.

SPENCER HEATER, LYCOMING DIV. — AVCO, Williamsport, Pa. — Booths 639, 641

In attendance: E. I. Boardman, C. W. Shaffer, R. R. Adams, K. E. Schooley, C. R. Miller, L. B. Gorman.

Exhibiting: "LW" low waterline commercial steel boiler, "Suburban" oil and "Rancher" gas fired residential units.

SPENCER THERMOSTAT DIV. — see METALS & CONTROLS CORP.

SPI-ROL-FIN CORP., 133 Greenwood Ave., Pequannock, N. J.—Booth 968

In attendance: F. R. Attwood, M. B. Belline, D. Attwood, Philip Orr, C. Rodkey, H. Higgins, N. J. Driscoll, T. H. Wirth, R. C. Edwards, E. A. Boguez.

Exhibiting: Baseboard radiation, oil and gas fired residential steel boilers, water heaters, industrial fin-pipe radiation, room air conditioners, water cooled condensers for air conditioning and refrigeration. Air cooled condensers for air conditioning will be featured.

SPORLAN VALVE CO., 7525 Sussex Ave., St. Louis 17, Mo.—Booth 1254

In attendance: H. F. Spoehrer, W. T. Carmody, W. F. Wischmeyer, J. T. Barry, W. H. Krack, D. B. Rentschler, M. D. McAnany, C. C. Grote, and territorial sales engineers.

Exhibiting: Thermostatic expansion valves, refrigerant distributors, solenoid valves, "Catch-All" filter driers, "Level-Master" control, 75 and 100 ton filter driers will be featured.

SPRAGUE ELECTRIC CO., North Adams, Mass.—Booth 516

SQUARE D CO., 4041 N. Richards, Milwaukee 12, Wisc.—Booth 757

In attendance: Edmonds Love, W. E. Helle, Frank Howard, G. G. Thorpe, J. B. Schifflin, L. M. Maresch, J. E. Wozniak, W. E. Foote, C. A. Metz, M. L. Johnson, J. W. Coughlin.

Exhibiting: Air conditioning and refrigeration control; pump control featuring working model of Class 9038, mechanical alternator, magnetic and manual; starters, disconnect switches and pushbutton stations. Class 9001 type C46 and C47 new two and three position selector switch available for flush mounting or in Nema I enclosure, and Class 9038 type CG and DG screw-in and flange mounted mechanical alternators for closed tank duplex pump systems will be featured.

STANDARD INSTRUMENT CORP., DIV. OF HEAT-TIMER CORP., 657 Broadway, New York 12, N.Y.—Booths 336, 338

STANDARD REFRIGERATION CO., 3535 W. Fillmore St., Chicago 24, Ill.—Booths N-432, N-434

In attendance: Harry A. Goldberg, Herman M. Goldberg, Richard R. Levin, Robert L. Rose, Russell E. Cook, Ralph E. Porter, Dwight D. Orr, Bruno A. Jaskulski, Trudy A. Sichel.

Exhibiting: Refrigeration condensers, liquid receivers, heat exchangers, parts.

STANDARD STAMPING & PERFORATING CO., 3131 W. 49th Pl., Chicago 32, Ill.—Booth 636

In attendance: Lloyd Stone, William Ramquist, Andrew La Vela, Robert Nickels.

Exhibiting: Registers and grilles.

STA-RITE PRODUCTS, INC., Delavan, Wisc.—Booth N-442

In attendance: R. M. Hayes, R. H. Olson, J. S. Petrolino, J. H. Matson.

Exhibiting: Centrifugal pumps, vertical turbines, regenerative turbines, self-priming centrifugals. New 2, 3, and 5 hp all-purpose centrifugals, and new series of self-priming centrifugal pumps, will be featured.

STEINEN MFG. CO., WM., 43 Bruen St., Newark 5, N. J.—Booths 329, 331

In attendance: Robert W. Hundley, Jesse Tankel, Chris Jensen, Jr., C. B. Wilson, Thornie House, Bruce McLouth, Ed Huckins, George Greulich, Alfred Greulich, George Heath, Howard Weller, John Weller, Paul O'Kane.

Exhibiting: "Mirror Finished" nozzles, draft regulators, ignition electrode assemblies. New line of draft regulators will be featured.

STEPHENS-ADAMSON MFG. CO. — see SEALMASTER DIV.

STERLING RADIATOR CO., INC., Westfield, Mass.—Booth 709

STEWART MFG. CO., INC., Grove Ave., Cedar Grove, Essex County, N. J.—Booth 50

In attendance: W. J. Fembleaux, F. J. Stewart.

Exhibiting: Air conditioning grilles and registers.

STEWART-WARNER CORP., HEATING & AIR CONDITIONING DIV., Lebanon, Ind.—Booths 1150, 1251

In attendance: William E. Judd, Herman E. Winkler, Walter E. Blake, Walter R. Leander, Norman J. Gill.

Exhibiting: Gas and oil furnaces, remote air conditioning equipment. Two new lines of furnaces, the "MB" and the "WIZ", "designed to meet demands of present day markets," will be featured.

STODDARD INDUSTRIES, INC., 1545 Kingsbury St., Chicago 22, Ill.—Booth 237

In attendance: Ford Stoddard, J. B. Blanton, Hazel Kline, C. A. Perlin.

Exhibiting: "Lifetime Dust-magnet" electrostatic filters. Photomicrographs proving electrostatic dust pick-up will be featured.

STRATTON & TERSTEGGE CO. — see ANCHOR DIV.

STRONG, CARLISLE & HAMMOND CO., 1392 W. 3rd St., Cleveland 13, Ohio—Booth 975

STURTEVANT DIV. — see WESTINGHOUSE ELECTRIC CORP.

SUNDSTRAND ENGINEERING CO., 1325 Seventh St., Rockford, Ill.—Booth 737

In attendance: Rupert H. Gustafson, Charles B. Bendix, Matt Miller, Frank Basler.

Exhibiting: Complete line of domestic oil burners, 0.65 to 15 gph. "Model SS" oil burner for application with boiler and furnaces as original equipment will be featured.

SUNDSTRAND HYDRAULIC DIV., 2210 Harrison Ave., Rockford, Ill.—Booths 617, 619

In attendance: B. F. Olson, L. H. Schuette, A. H. Swenson, C. W. Lang, B. L. Douglass, R. W. Kiefer, J. F. Griffey, R. E. Stevens, B. L. Soderberg, J. F. Nelson, J. R. Holmin, S. Ferraro, R. W. Erikson.

Exhibiting: One and two-stage high pressure fuel units, operating; two-stage air-oil low pressure fuel unit, operating. Constant speed truck refrigeration drive will be featured.

SUN-RAY BURNER MFG. CORP., 139-24 Queens Blvd., Jamaica 35, N. Y.—Booths 1221, 1223, 1225

In attendance: Gabe M. Marin, Alfred Metzger, Alfred Luft, Robert Adcock, Jack Maxwell, Joseph Bierwirth, Frank Sieffert, Chick Meehan, Lester Baughman, Burt Vickery, William Oliver.

Exhibiting: Complete line of high pressure gun-type oil burners from 0.5 to 22 gph for Nos. 2, 4 and 5 fuel oil, four models of fuel oil transfer pumps.

SURFACE COMBUSTION CORP. — see JANITROL HEATING & AIR CONDITIONING DIV.

SYNCHRONOUS FLAME, INC., North Main St., Walworth, Wisc.—Booths 522, 524, 526, 528

SYNCROMATIC CORP., 1141 Tenth St., Watertown, Wisc.—Booth 343

In attendance: H. M. Stillman, George Day, Ted Jaye, Jim Jaye, Frank Cline.

Exhibiting: Oil-gas furnaces and air conditioners. New "Meridian" oil and gas fired furnaces adaptable to cooling will be featured.

TACO HEATERS, INC., 1160 Cranston St., Cranston 9, R. I.—Booth 1021

In attendance: J. Balter, R. H. Chaffee, W. P. Haney, T. J. Wolanski, M. Stehrenberger, H. Spring, P. G. Leddy, W. E. Johnson, J. H. White, R. T. Schoerner, V. F. Callahan, G. L. Benjamin, R. Monahan, I. W. Chase, R. H. Stevenson.

Exhibiting: Hot water heating specialties — hot water circulating pumps. "Flochecks", air scoops, steam valves, hot water valves, "MP" series pumps, "# 170" series centrifugal pumps.

TECUMSEH PRODUCTS CO., Tecumseh, Mich.—Booth 1114

In attendance: District managers from district offices in Great Neck, L. I., N. Y.; Dallas; St. Louis; Los Angeles; Atlanta; Chicago; Adrian, Mich.; and Seattle, as well as personnel from plants at Tecumseh, Mich. and Marion, Ohio, including F. G. Purcell, D. J. Bowen, P. G. Colgrove, W. Macbeth, A. S. Russell, E. D. Halsey, W. W. Higham and H. M. Kelso.

Exhibiting: Full line of hermetic compressors from 1 to 5 hp for residential air conditioning;selected compressors for window air conditioners. New "Rotalock" valves are included on all larger models, "allowing simple interchange between valves and tubes in the factory or field." The valve or tube may be set and locked in any location through 360 deg, eliminating compound or short bends.

TEMCO, INC., 4101 Charlotte Ave., Nashville, Tenn.—Booths 625, 627, 629

In attendance: Cecil B. Oakley, Lee W. Rasch, William H. Ferriss.

Exhibiting: Gas floor furnaces, gas wall heaters, gas room heaters, gas warm air furnaces with combination air conditioning, gas unit heaters. Wall heater with draft relief built into heat chamber and requiring no draft hood, and with blower attachment to provide rapid circulation of heated air, available for single as well as dual wall models, will be featured, as will air conditioning equipment with pre-charged lines and pre-charged components, including suspended air-cooled air handling unit for commercial applications, and 2 hp and 4 hp self-contained attic units with prefabricated duct work.

THATCHER FURNACE CO., Center St., Garwood, N. J.—Booth 915

In attendance: Carl Sahler, R.. M. Cook, M. C. Beard, S. B. Leigh, Jack Price, W. J. Klotzbach.

Exhibiting: Representative line of oil and gas fired winter air conditioners and boilers; air and water cooled summer cooling units. New gas fired winter air conditioner will be featured.

THERMO-BASE DIV.—see GERWIN INDUSTRIES, INC.

THERMOBLOC DIV., PRAT-DANIEL CORP., 2 Meadow St., So. Norwalk, Conn.—Booth 52

In attendance: R. F. Sharon, J. F. Hines, T. K. Lau, W. H. Engels, R. Tenney.

Exhibiting: Overhead "Panelbloc" infra-red industrial gas unit heaters; "Thermobloc" oil and gas fired industrial heaters.

THERMO-PRODUCTS, INC., Garfield Ave., North Judson, Ind.—Booth N-324

In attendance: J. S. Cunningham, H. M. Pugh, D. L. Culver, Raymond Nordsrom, Wm. Bozung, James Schaeffer, C. W. Shank.

Exhibiting: Oil fired furnaces, gas fired furnaces, hot water boiler, air conditioning.

THRUSH & CO., H. A., Peru, Ind.—Booth 1173

TITUS MFG. CORP., P. O. Box 810, Waterloo, Iowa—Booths 117, 121

In attendance: Donald L. Titus, Robert W. Titus, J. D. Davis, J. S. Smith, Harold E. Straub, E. F. Averill, Robert E. Wirth, Marlin A. Cook, Frank J. Coates.

Exhibiting: Complete line of air diffusion outlets for all applications. "New ideas and new applications for special custom work" will be available also at the exhibit.

TORIDHEET DIV., CLEVELAND STEEL PRODUCTS CORP., 16025 Brookpark Rd., Cleveland 11, Ohio—Booths N-308, N-310, N-312

In attendance: R. J. Lucas, D. W. Rouse, C. H. Strack, W. K. Hafer, B. F. Mondale, J. F. Doyle.

Exhibiting: Oil conversion burners, wall flame and gun; gas conversion burners; comfort cooling equipment; oil furnaces; gas furnaces; boiler burner units (oil).

TORRINGTON MFG. CO., THE, Torrington, Conn.—Booth 816

In attendance: D. B. Robinson, William Cashen, C. A. Hathaway, L. C. Lindstrom, F. C. Hohmeister, T. Porter West, M. B. Hunting, R. O. Kennedy, Jr., K. Merz.

Exhibiting: Blower units, large blower wheels, "Airotor" blower wheels, individually bladed tab lock wheels, fan blades. New "V. B." blower units, tab lock blower wheels, and offset fan blades will be featured.

TRANE CO., THE, Third and Cameron Sts., La Crosse, Wisc.—Booths 3, 7

In attendance: R. E. Lee, V. E. Bushnell, J. M. Whalen, R. G. Lubinsky, L. R. Fuller, M. L. Hoglund, W. R. Barnard, H. F. Griese, W. G. Wassmandorf, K. W. Shannon, P. L. Hughes, L. E. Daniel, A. L. Wasserman, J. F. Eckelaert, D. D. Ammentorp, E. A. Cline, A. C. Menke, A. J. Hackl, R.H. Pearse, Jr., H. J. Case, V. R. Simpson, Jr., W. E. Graham, Jr.

Exhibiting: "CenTraVac" automatic hermetic centrifugal refrigeration unit (water chiller); "Cold Generator" reciprocating compressor refrigeration unit (package chiller); "Climate Changer" fan-coil air handling unit (large capacity); "Multi-Zone Climate Changer" (larger capacity); reciprocating compressor for air conditioning and refrigeration; Class III fans for high pressure air conditioning system application; utility fans-package ventilating units; "Torrivent" unit heater (heavy duty blower type); steam specialties — traps, valves, etc.; "Wall-Fin" pipe- coil heating unit (finned radiation); baseboard residential convector unit; unit ventilators; unit heaters (steam, hot water, gas fired); cooling and heating coils; brazed aluminum heat exchangers for oil cooling, electronic tube cooling, cockpit cooling, chemical process work, etc.; "Induction UniTrane" high pressure room air conditioning units; self-contained packaged year around air conditioning units. "Torrivent" unit heater, "Multi-Zone Climate Changer," self- contained packaged year around air conditioning units, Class III high pressure fans, unit ventilator shelving, bucket trap, float and thermostatic trap, utility fans, and "Type C" all purpose room cabinet type convector heating unit will be featured.

TRERICE CO, H. O., 1420 W. Lafayette Blvd., Detroit 16, Mich.—Booths 765, 767

TRIAD SALES CORP., 5121 N. Clark St., Chicago 40, Ill.—Booth 124

TRION, INC., 1000 Island Ave., McKees Rocks, Pa.—Booth 1210

In attendance: Donald W. Boehler, William F. Watson, James W. Hall, Jr., William A. Gill, John W. Tadlock, Carl Morlock, William R. Murdock, Richard E. Sweitzer, Hank C. Fry, Edward Hengstler, John Golden.

Exhibiting: "HEV" high efficiency, high velocity electronic air cleaner; traveling oil curtain mechanical filter; mechanical filter panels. New line of standard packaged electronic air cleaners in capacities from 1000 to 9600 cfm for use with any size furnace or air conditioning unit, including vertical air flow models, will be introduced.

TRIPLEX HEATING SPECIALTY CO., INC., THE, 248 N. Grant St., Peru, Ind.—Booth N-429

In attendance: W. S. Petty, C. E. Denny, R. S. Waite, L. H. Wise, L. R. Peters.

Exhibiting: Hot water heating circulators, headers for radiant heating, flow control valves, one-pipe fittings (iron and brass) and other miscellaneous hot water heating specialties, pressure control valves. Air trap specifically designed for horizontally tapped hot water heating boilers will be featured, as will a tank drain fitting.

TUBE MANIFOLD CORP., 415 Bryant St., North Tonawanda, N. Y.—Booth N-221

In attendance: Dean M. Rockwell, Richard F. Burke.

Exhibiting: Refrigeration receivers and component parts.

TUTHILL PUMP CO., 939 E. 95th St., Chicago 19, Ill.—Booth N-438

In attendance: P. W. Berg, A. L. Caney, M. J. McCaughey, J. G. Tuthill, J. D. Young.

Exhibiting: Special and standard pump units.

New belt-driven pump sets for heavy fuel oil transfer service will be featured.

TUTTLE & BAILEY DIV. OF ALLIED THERMAL CORP., 215 Warren St., New Britain, Conn.—Booth 654

In attendance: R. D. Tutt, F. W. Adams, D. D. O'Neill, Stanley Hart, G. W. Copeland, D. E. Murray, W. L. Batchelor, R. S. Rickabaugh, George Scribner, W. G. Kleinhomer, J. Whitehouse, J. H. Faller, J. F. Wolff, L. B. Wilson, M. R. Burreson, J. F. Wyatt.

Exhibiting: High pressure air distribution equipment, ceiling diffusers, air conditioning grilles and registers, baseboard. Pressure reducing valve will be featured.

TYPHOON AIR CONDITIONING CO., DIV. OF HUPP CORP., 505 Carroll St., Brooklyn 15,N. Y.—Booths 413, 415, 417

In attendance: Leon J. Alyanakian, C. A. Comstock, John Graham, Joy S. Hurd, Seymour H. Jarcho, Melvin H. Klingher, Henry Lesieur, A. G. Masiello, Larry D. Spence, Ed. Seergy, Gordon Shewman, John F. Wilcox, George D. Yeazel, Robert E. Newlin, Jim DePartee, Duane Krohn, Clyde Lancaster, John Maycock, Douglas Via, Les Brosell, W. W. Dukes, Arthur H. Farr, S. Byron Stone, Norman Mendes, Murray M. Kabili, Maurice Firestone, Mark Mooney, Don V. Petrone.

Exhibiting: Self-contained packaged unit, air cooled condensing units, low side units, high side units, water chiller, attic units, furnaces.

UNION ELECTRIC & MFG. CO., 1057 Summit Ave., Jersey City 7, N. J.—Booth 306

In attendance: Louis J. Newman, Henry Winston, Charles Rapiport, Sidney S. Blackman.

Exhibiting: "Super Long Life" ignition transformers.

UNITED ELECTRIC CO.—see MAGIC AIRE DIV.

UNITED SHEET METAL CO., INC., 540 S. Drexel Ave., Columbus 9, Ohio—Booth N-229

In attendance: James McGill, Jack Wolman, Maurice Lautenslager, Lige Collins, E. M. Schleppi, Richard Chesrown.

Exhibiting: Spiral lockseam pipe, sheet metal fittings, sound absorbers.

UNITED STATES AIR CONDITIONING CORP., 7900 Tabor Rd., Philadelphia 11, Pa.—Booths 1029, 1033

In attendance: D. E. Feinberg, L. P. Hanson, James H. Flowers, Frank Klein, J. H. Montgomery, Wm. Moiselle, Robt. McLain, Leonard Gordon.

Exhibiting: New air cooled condensers, improved "RK" central station units, new blower coil units, new store type packaged air conditioners, new combination units. New line of store air conditioning units, new designs of air cooled condensing units, and improved central station units will be featured.

UNITED STATES REGISTER CO., 344 E. Burnham St., Battle Creek, Mich.—Booth 1036

In attendance: Harry G. Hollman, A. A. Stagg, E. P. Kromdyk, C. J. Pearson.

Exhibiting: Air conditioning registers, vents and grilles; back pressure and exhaust fan dampers; air conditioning accessories. Perimeter base intake, base diffuser, and diffuser sidewall register will be featured.

UNIVERSAL DIFFUSER CORP., 38 Marbledale Rd., Tuckahoe, N. Y.—Booth 1236

In attendance: Charles Davies, J. S. Brown.

Exhibiting: Complete line of "Flexiflo" diffusers — circular, square, rectangular, fixed circular, "Line-Air," etc. Long strip diffuser and fixed circular diffuser will be featured.

UTILITY APPLIANCE CORP., 4851 Alameda St., Los Angeles 58, Calif.—Booth 609

In attendance: Herbert Leo, Stan Skatte, Jerry Pinkus, Dick Peterson, Leo Hungerford, C. F. Cushing.

Exhibiting: Gas furnaces (upflow, counterflow, horizontal); gas fired unit heaters; combination heating and air conditioning unit; remote air cooled air conditioning equipment; evaporative air coolers.

UTILITY FAN CORP., A DIV. OF UTILITY APPLIANCE CORP., 911 E. 59th St., Los Angeles 1, Calif.—Booth 608

In attendance: Vance Smith, Leo Gorsey, Marc McGuire, Herb Leo, Stan Skatte, Dick Petersen, Tom Kindred.

Exhibiting: Blowers and blower parts.

VAN-PACKER CO., DIV. OF THE FLINTKOTE CO., 1049 State St., Bettendorf, Iowa—Booth N-437

In attendance: O. E. Collins, W. W. Ford, E. M. Kennedy, R. D. McFarland.

Exhibiting: All fuel chimney, model "G" gas vent, industrial stack.

VAPOR HEATING CORP., 80 E. Jackson Blvd., Chicago 4, Ill.—Booth N-409

In attendance: L. A. DiLucchio, T. J. Neunsinger, Witt Farley, W. M. Smith, Frank Semrau, H. J. Wilcox, O. M. Chiesl, W. E. Wright, W. R. Bradley, G. R. Bailey.

Exhibiting: New 160 hp low pressure, drum type heating boiler; new 200,000 Btu "Waikiki" space heater.

VELOCITY-POWER TOOL CO., 201 N. Braddock Ave., Pittsburgh 8, Pa.—Booths 1229, 1231

In attendance: William G. Kulesz, Raymond E. Ginn, Jr., Charles B. Conway, Earle A. Widemann.

Exhibiting: "Lawco" portable pipe threader; "Torch-O-Matic" soldering, brazing, melting torches; stud hammer.

VENTFABRICS, INC., 640 N. Kedzie Ave., Chicago 12, Ill.—Booth 312

In attendance: James Bateman, Jr., DuPont Snowden, Jeanne Nauman.

Exhibiting: Fabrics for flexible connections and damper hardware. Insulated access doors will be featured.

VIBRATION ELIMINATOR CO., THE, 10-28 47th Ave., Long Island City 1, N. Y.—Booth 532

In attendance: Samuel Kahn, M. E. Miller, Louis E. Imbert.

Exhibiting: Vibration eliminators of various types, including heavy duty; rails with built-in isolation units; overhead units, pipe hangers; etc.

VIBRATION MOUNTINGS, INC., 98-25 50th Ave., Corona 68, N. Y.—Booth 1156

In attendance: B. A. Ross, N. J. Mason, H. Harris, F. A. Balzer, J. Marshall, B. Fallon.

Exhibiting: Vibration control mountings and materials utilizing steel springs, rubber-in-shear, cork, and combinations of these materials. A new line of neoprene-in-shear vibration mountings in three sizes with a load range of 10 to 1250 lb per mounting, and a new vibration mounting and method of application for the isolation of air conditioning and refrigeration equipment foundations utilizing the reinforcing rods of the foundation and making the vibration mounting an integral part of the concrete block, will be featured.

VIKING AIR PRODUCTS DIV., NATIONAL U. S. RADIATOR CORP., 5601 Walworth Ave., Cleveland 2, Ohio—Booth 549

VILTER MFG. CO., THE, 2217 S. First St., Milwaukee 7, Wisc.—Booth N-321

In attendance: L. L. Diener, H. J. Eggert, J. F. Heil, R. A. Klokner, J. B. Kupfer, C. D. McCrindle, H. H. McKinnies, F. T. Pallanch, D. E. Perham, M. F. Tokach, A. O. Vogel.

Exhibiting: Self-contained liquid chiller ("Uni-Chiller") consisting of a six cylinder "F-12" VMC compressor, a 20 in. x 10 ft insulated chiller, a 12in. x 9 ft condenser and a 75 hp motor, all mounted on a steel base to form a compact, complete assembly.

VULCAN RADIATOR CO., 775 Capitol Ave., Hartford 6, Conn.—Booth 927

In attendance: Joseph D. Pierce, Walter E. Bell, Martin Trachtenburg, Milton L. Lundgren, John H. Ehn.

Exhibiting: Commercial and residential baseboard, electric baseboard, heating-cooling baseboard, "Linoventilator", and other products.

WAGNER ELECTRIC CORP., 6400 Plymouth Ave., St. Louis 14, Mo.—Booth 1129

In attendance: J. H. Devor, H. N. Felton, A. C. Allen, L. C. Dobrunz, M. H. Nelson, P. C. Ford, C. E. Widell, A. F. Frohardt, R. B. Vassier, E. G. Sherrill, J. B. Holston, J. H. Wolf, L. W. Carnahan, G. J. Halas, M. D. Paul, G. H. Rentschler, S. R. Snyder, R. L. Tucker, P. D. Young, A. A. Sederholm, F. B. Minx, M. B. Atkinson, R. F. Bryant, A. H. Beasley, C. E. Metcalf, L. A. Murphy, W. H. Gilster, P. M. Postelthwaite, R. H. Lane, R. W. Larson, R. K. McLuen, E. O. Krueger, P. M. Burgess, B. M. Saunders, P. F. Ryan, F. H. Vocks.

Exhibiting: Electric motors for heating and air-conditioning equipment. New design 48 frame fractional horsepower motors will be featured.

WALKER MFG. & SALES CORP., 1701-17 Penn St., St. Joseph 1, Mo.—Booth 920

In attendance: Andrew H. Ziph, LeRoy Bartholomew, Raymond Denning, Stanley H. Burt, B. L. Rushton, H. J. Nicholson, R. E. Michel, Harry G. Johnson.

Exhibiting: Commercial and industrial draft controls; domestic automatic draft regulators, double-swing draft regulators for gas; draft inducers for combustion equipment; and chimney caps for low draft chimneys. New safety controls for double-swing regulators for gas and combination draft inducer regulators will be featured.

WALLACE CO., WILLIAM — see METALBESTOS DIV.

WALTON LABORATORIES, INC., 1186 Grove St., Irvington 11, N. J.—Booth 434

In attendance: Wm. Feldermann, Jack Feldermann, Robert J. Lewis, Frank Hartwell, J. B. Wenclik.

Exhibiting: Industrial, residential, and duct type humidifiers; humidistats; humidity indicators. New duct type humidifiers, "which make it possible to adapt mechanical atomizer operation to duct systems," will be featured.

WARREN ENGINEERING CO., Route 24, Broadway, N. J.—Booth N-414

In attendance: George E. Breece, Jr., Frank H. Stephan, Russell McElroy.

Exhibiting: Temperature control valves, pressure regulators, electric motor-operated valves, diaphragm control valves.

WATERLOO REGISTER CO., INC., P. O. Box 72, Waterloo, Iowa—Booth 337

In attendance: E. T. Kelly, W. B. Mooney, V. H. Kyhl, R. E. Nemmers, J. M. Simatovich, L. E. Zumbehl, H. L. Jorban, C. H. Houghton, F. E. Clark.

Exhibiting: Wall registers and grilles for heating, ventilating and air conditioning; volume control dampers for heating, ventilating and air conditioning; door and partition grilles (no-sight) for ventilating.

WATERMAN-WATERBURY CO., THE, 1121 N. E. Jackson St., Minneapolis 13, Minn.—Booth 448

In attendance: Harry G. Cross, David E. Sedgwick, Stuart A. Smith, Charles A. Reichelderfer, John D. Holmgren, F. W. Legler, James R. Hansen, Keith J. Anderson, Roy L. Lonson, Norman MacIntyre, O. M. Griefnow, E. M. Delaney, Ira W. Metcalf, F. R. Boedecker, H. C. Lohman, D. W. Mathison, H. G. Boyer.

Exhibiting: Year round "Comfortrol" system, winter air conditioners (gas, oil and coal fired); water cooled and air cooled summer air conditioners, gas conversion burners. Year round "Comfortrol" will be featured, and 50th year anniversary of manufacturer will be marked.

WATTS REGULATOR CO., 10 Embankment St., Lawrence, Mass.—Booth 135

In attendance: G. B. Horne, B. G. Robertson, A. J. Harvey, Jr., V. R. Bitzer, R. W. Rassbach, M. Mercury, T. Mercury, S. Fitzgerald.

Exhibiting: ASME rated water pressure relief valves, temperature and pressure relief valves; regulators for steam, water and air, boiler water level controls. New design high capacity ASME rated water pressure relief valves with expanded outlets, and steam temperature regulators, will be featured.

WAYNE HOME EQUIPMENT CO., INC., 801 Glasgow Ave., Fort Wayne 4, Ind.—Booth 1169

In attendance: Jack Nace, G. J. Klopfenstein, J. J. Thurston, C. V. Copeland, N. G. Berghoff, B. G. Duer.

Exhibiting: Oil burners.

WEATHERHEAD CO., THE, FORT WAYNE DIV., 128 W. Washington St., Fort Wayne, Ind.—Booth N-239

In attendance: A. S. Wade, George R. Anderson, Warren D. Mack, J. R. Holmer, R. B. Phillips, Charles Sutton, Charles Craig.

Exhibiting: Flared and flareless industrial brass and steel tube fittings, hydraulic and air conditioning components.

WEBSTER ELECTRIC CO., 1900 Clark St., Racine, Wisc.—Booth 572

In attendance: D. J. Munroe, H. C. Stacey, W. E. Dent, R. A. Lewane, P. G. Crewe, B. T. Wiechers, Louis Ehrich, Wm. Wenszell, Herb Weinbrenner, George Brinkerhoff, John Kralicek, Paul Deuble, Tom Godburn, Jr., Louis E. Woolf, Paul Maurice, Otto Neilsen, John McAlvay, Lou Schwob, Don Hall.

Exhibiting: "ServiceSaver" fuel pump, ignition transformers, "Delavtrol" solenoid valves, the fuel pump being featured.

WEBSTER & CO., WARREN, 17th & Federal Sts., Camden 5, N. J.—Booths 706, 708, 710

In attendance: Warren Webster, A. R. Webster, D. F. Bennett, N. W. MacNichol, J. C. Woodson, I. G. Brennan, J. J. Poyatt, B. F. Lerch, L. H. Plum, D. E. Morgan, J. C. McKeown, C. H. Grissom, III, R. D. Hubbard.

Exhibiting: Complete line of heating and air conditioning products, and hot water and steam specialties. New "Tru-Perimeter" baseboard, new "Cool Air" systems, and new "Newport" year-round air conditioner will be featured.

WEIL-McLAIN CO., Michigan City, Ind.—Booths 947, 951

In attendance: Martin Weil, F. R. Westphal, M. E. Mitchell, R. M. Stockwell, P. R. Stockwell, C. A. Wolff, J. E. Sorensen.

Exhibiting: Complete line of gas-fired boilers (including cutaways), gas and oil-fired package units, heavy duty boiler for horizontal rotary oil burner (cutaway); new "No. 72" oil heating unit, "Easy-Fit" header, new "Coolmate" fan coil unit and packaged water chiller, "Snug" baseboard panels, new "Type P-AG" gas-fired package unit.

WEIL PUMP CO., 1530 N. Fremont St., Chicago 22, Ill.—Booths 1142, 1144, 1146, 1148

In attendance: R. T. Sheridan, W. L. Luther, J. D. Spooner, J. P. Palumbo, F. Feder, L. V. Woolum.

Exhibiting: Submersible sewage ejectors, submersible sump pump, suspended non-clog sewage ejectors, condensate pump, circulating pump. Large schematic drawing showing complete heating system using illustrations of all types of condensate and circulating pumps in exhibitor's line and their functions and relation to each other will be featured, as will operating models of submersible and suspended type sewage ejectors and submersible sump pumps.

WESTINGHOUSE ELECTRIC CORP., 401 Liberty Ave., Pittsburgh 30, Pa.—Booths 902, 1003, 1007, 1103

In attendance: R. J. Moore, W. B. Cott, W. T. Rogers, C. R. Rhine, N. R. Miller.

Exhibiting: Air conditioning, heating and ventilating equipment; "Corox" heaters; electric motors, electric motor control; speed reducers and speed increasers.

WHEEL TRUEING TOOL CO., 3200 W. Davison Ave., Detroit 38, Mich.—Booth N-346

In attendance: Karl J. Klapka, R. E. Chatterton, Adam Knuth, D. Harris, A. Bauer, D. Lubanko, R. S. Smith.

Exhibiting: "Truco" diamond drilling machine, diamond drilling equipment and accessories, diamond drill motors, diamond drill bits, swivels, water pick-ups.

WHIRLPOOL-SEEGER CORP., St. Joseph, Mich.—Booths N-234, N-236, N-238

WHITE-RODGERS CO., 1209 Cass Ave., St. Louis 7, Mo.—Booths 427, 429, 431

In attendance: J. Powell, A. E. Petersen, E. E. Harwood, R. N. Weber, W. Hawkins, V. Hertz, A. Hudson, W. Dague, W. Galloway, J. Morgan, J. Maney, R. Jehling, E. Raithel, R. Kind, E. Wechsler, D. Westcott, H. G. Campbell, E. C. Robinson, E. Ball, R. A. Sherer.

Exhibiting: Complete line of automatic controls for heating, refrigeration and air conditioning. "Fashion" room thermostat, with new shape and color, and with hinged cover which enables it to be painted and "disappear" into the wall; new oil burner controls with new type heat sensing element which enables the primary control to be mounted on the equipment before shipment from the factory; new hot water controls with new design well immersion to give fast response to temperature changes; and combination oil burner-hot water controls designed to cut down materially on wiring, time and materials will be featured.

WIEGAND CO., EDWIN L., 7500 Thomas Blvd., Pittsburgh 8, Pa.—Booth N-439

In attendance: C. F. Kreiser, W. L. Thomson, William Potter, T. A. McLean, George Sowash, W. G. W. Glos.

Exhibiting: "Chromalox" electric unit ventilators, electric fan-type recessed wall heaters, electric cabinet convectors, electric baseboard heaters, electric floor drop-in heaters, electric in-duct heaters, electric duct-type unit heaters, electric all metal radiant-wall panels.

WILLIAMS DIV. — see EUREKA WILLIAMS CORP.

WILSON MFG. CO., 787 S. Bardsdale St., Memphis 4, Tenn.—Booths N-426, N-428

In attendance: Frank R. Wilson, E. V. Dunbar, George Dunbar, Walter Evans, Percy G. Hansen, W. J. McKeough, Arthur Quantrell, Rudy Wolfe.

Exhibiting: Complete line of new tubing tools consisting of flaring, cutting, bending and swedging for all types of tubing. Each tool is, identified by an individual and separate colored printed box, with a new numbering system to identify a particular tool.

WINCHESTER-WESTERN DIV., OLIN MATHIESON CHEMICAL CORP.—see RAMSET FASTENING SYSTEM

WING MFG. CO., L. J., Linden, N. J.—Booth 1211

In attendance: H. S. Wheller, C. H. Smith, T. R. Peyrek, G. Nash, H. J. Clemens, C. W. Diemecke, D. J. Guerin, E. D. Rosenberg, H. D. Barr, R. H. Langer, Geo. Felty, T. F. Schenke, H. L. Kister, A. W. Carter, K. E. Herbert, Howard C. Roller, R. J. McCrory, G. M. Comstock.

Exhibiting: Revolving unit heater, fresh air supply heater, gas utility heater, duct fan, draft inducers, motorized and turbine driven forced draft fans, auxiliary steam turbine.

WIREMOLD CO., THE, Hartford 10, Conn.—Booth 213

In attendance: Robert S. Dutton, William E. Rejeski, Paul O. Roedel, Jr.

Exhibiting: Flexible air ducts.

WOLVERINE TUBE DIV. OF CALUMET & HECLA, INC., Guardian Towers, Guardian Bldg., Detroit 26, Mich.—Booth N-327

In attendance: J. M. Dumser, R. C. Crowe, R. T. Davies, E. J. Campbell, H. A. Harty, C. H. Kuthe, and others.

Exhibiting: "Trufin" integral finned tubing; "Capilator" controlled ID capillary tube used for restriction purposes, "so tiny it can be sealed with a pin"; "Roll-O-Tube" roll of copper tube on a reel; aluminum evaporator assembly containing copper-to-aluminum connector, the accumulator, the coil.

WOOD CO., JOHN, HEATER AND TANK DIV., 100 Washington St., Conshohocken, Pa.—Booth N-206

WORTHINGTON CORP., Harrison, N.J.—Booths 954, 958, 962, 1055, 1059, 1063

In attendance: A. F. Ward, F. J. Watt, F. J. Blacker, C. Bengle, P. McLeod, P. Dalton, R. O. Gundlach, D. Flynn, F. Dolar, J. Klaiber.

Exhibiting: Hermetic centrifugal refrigeration compressor; two-stage centrifugal; induction circulator; "Flexicool" packaged air conditioners; packaged chillers; air handling units; furnaces. The "Climate Van," a mobile display of packaged air conditioning and heating equipment, will be featured, as will the hermetic centrifugal.

XXTH CENTURY HEATING & VENTILATING CO., THE, 96 Ira Ave., Akron 1, Ohio—Booth 628

In attendance: J. Garver Kerch, R. K. Long, John G. Kerch, Jr., Walter H. Stashkiw.

Exhibiting: Cast iron gas, oil and coal warm air furnaces; residential air cooled air conditioning. New air conditioning line with remote air cooled condensing units in connection with evaporator coil installed in warm air plenum will be featured, as will "unconditional life-time guarantee on the entire heating element on all of the manufacturer's gas fired furnaces for the homeowner."

YEATS APPLIANCE DOLLY SALES CO., 2124 N. 12th St., Milwaukee 5, Wisc.—Booth N-425

In attendance: James Barksdale, Albert F. Marin, Virginia Marin.

Exhibiting: Appliance dollies and padded covers to protect equipment during delivery. "Heavy Duty" half-ton capacity dolly, designed for easy handling of such equipment as furnaces and 80 gal water heaters, with aluminum alloy frame, caterpillar step glides, patented strap ratchet and with two straps and ratchets and four wheels, enabling operator to roll heavy equipment on the horizontal rather than balance it vertically, will be featured.

YORK CORP., INDUSTRIAL DIV., York, Pa.—Booth 32

In attendance: Henry M. Haase, Ray K. Serfass, J. J. Floreth, J. Donald Smith, W. L. Pharo, L. P. Quinlivan, C. N. Ehehalt, R. G. Werden, M. S. Lebair, Fred Wood, Chris Schurman, H. W. Broadwell, E. E. Edwards, M. M. Crout.

Exhibiting: "Turbomatic" compressor, complete new line of induction units, complete new line of fan window air conditioners.

YORK-SHIPLEY, INC., York, Pa.—Booths 111, 113, 115

YOUNG RADIATOR CO., 709 S. Marquette St., Racine, Wisc.—Booth 206

In attendance: F. M. Young, J. J. Hilt, W. G. Schlichting, P. J. Menden, G. R. Gibson, H. F. Brinen, J. Sidwell, P. Evans.

Exhibiting: Air conditioning units, "Perimaheat" baseboard convectors, heating and cooling coils, unit heaters, convectors. Type "H" unit heaters and "Roomaire" conditioners will be featured.

YOUNG REGULATOR CO., 5209 Euclid Ave., Cleveland 3, Ohio—Booth 724

In attendance: E. O. Young, W. J. Zimmer, R. J. Komar, Alec Byfield.

Exhibiting: Damper regulators and accessories, remote control regulators, air-split damper regulators, registers, air conditioning grilles, no-vision grilles, ceiling diffuser.

ZATKO METAL PRODUCTS CO., 20850 St. Clair Ave., Euclid 17, Ohio—Booth 940

In attendance: Lester T. Zatko, J. L. Menart, F. P. Gibbons, B. McLouth, D. Darnell.

Exhibiting: Pulleys and V-belts.

The object of the Society is to advance the arts and sciences of heating, ventilating, cooling and air conditioning, and the allied arts and sciences, for the benefit of the general public, to encourage and conduct scientific research, and to cooperate with other organizations having the same or similar objectives.

SOCIETY OFFICERS

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First Vice President	P. B. Gordon
Second Vice President	E. R. Queer
Treasurer	R. A. Sherman
Executive Secretary	A. V. Hutchinson

COUNCIL

Three Years: A. B. Algren, John Everetts, Jr., J. N. Livermore, J. H. Ross.

Two Years: B. W. Farnes, C. B. Gamble, W. A. Grant, D. M. Mills.

One Year: J. H. Fox, John E. Haines, A. J. Hess, C. H. Pesterfield, B. H. Spurlock, Jr.

COUNCIL COMMITTEES

Executive: P. B. Gordon, Chairman; E. R. Queer, R. A. Sherman

Finance: A. J. Hess, Chairman; W. A. Grant, J. N. Livermore, R. A. Sherman (Ex Officio).

Membership: B. W. Farnes, Chairman; D. M. Mills, J. H. Ross.

Program and Papers: W. A. Grant, Chairman, John Everetts, Jr., C. H. Pesterfield (see Program Subcommittee, JOURNAL SECTION, January 1957, p. 218).

Regions Central Committee: E. R. Queer, Chairman; John Everetts, Jr., (1); C. H. Pesterfield (2); John E. Haines (3); A. J. Hess (4); C. B. Gamble (5); D. M. Mills (6); J. H. Fox (7).

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Heating, Piping & Air Conditioning

Journal Section

of the

AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS

AIR CONDITIONING COMES OF AGE

Walter A. Grant, Member of Council, writes of important advances made in air conditioning equipment during the past 20 years. The second installment of this paper prepared for the program of the Chicago Meeting starts on page 233.

GETTING RID OF COMBUSTION PULSATIONS

Ever have a boiler or furnace go into pulsation with resulting noise or vibrations? If so, you will welcome suggestions for avoiding this state of affairs. As a part of the Society Research Program, a study is reported with examples showing how to tackle the problem. There are data here which can be directly applied. Turn to page 251.

INDUSTRIAL VENTILATION

One of the features of the Technical Program at the Chicago Meeting is a symposium session on Industrial Ventilation. Five qualified speakers are to present their views on timely topics concerning Industrial Ventilation practices. In this issue is the full text of the remarks of two of these five speakers. They will be found on pages 241 and 247.

SOCIETY COMMITTEE ORGANIZATION

General Committees: The By-Laws provide for 9 such committees. The latest listing was included in January 1957 issue on pages 218-19

Research Committees: The research program is under the guidance of the Committee on Research — a General Committee. The Committee on Research appoints Technical Advisory Committees as needed. Latest list, with current membership, appeared in January 1957 issue 218-19

Special Committees: At present there are 9 of these committees. Latest list of them and of their personnel can be found in the January 1957 issue on page 219

Nominating Committee: This committee's membership is fixed by the By-Laws. Membership was listed in the January 1957 issue on page 219

SOCIETY REGIONAL ORGANIZATION

Names of the **Regional Directors** and a list of members of the **Chapters Regional Committee** can be found in the January 1957 JOURNAL on pp. 218-19

SOCIETY CHAPTERS AND BRANCHES

The Society has chartered **66 Chapters, 6 Student Branches** and **1 Special Branch.** These groups elect their officers and governing boards. A list of the **presidents and secretaries appears in this issue of the** JOURNAL on page 267-68

The President's Page

My Fellow Members:

Soon I will finish my term of office and carry away memories of pleasant associations with many of you at committee, chapter and national meetings. All have been most kind and cooperative during the past year, and I wish I could thank you individually, but I do want you to know I am grateful for the experiences and privileges you have extended to me.

For those of you unable to attend the Annual Meeting in Chicago, my year-end report, to be published later, will endeavor to review significant Society happenings. To those who are planning to be in Chicago the end of February, I would like for this message to direct attention to certain activities that have been planned for your professional advancement and enjoyment.

Registration: Unfortunately all Society members and friends cannot be housed in one hotel; so as soon as possible after arrival, I urge you to visit the central registration headquarters at the Conrad Hilton Hotel. There is no registration fee and this registration is important to assist others who may inquire about your hotel location. Also this contact will afford the local committee the opportunity to acquaint you with planned events.

Technical Program: Our Program and Papers Committee has diligently endeavored to present a well-balanced program. All morning technical sessions have been planned, leaving afternoons for other activities. Authors of papers need the inspiration of your attendance at technical sessions, and surprisingly you will find the discussion of some paper foreign to your special interest frequently develops new ideas. Of special interest at the first Monday morning session will be a paper which traces the development of the air-conditioning industry during the last 20 years and offers projections for the future. This should be an important date on your engagement calendar.

Research: One of the vital cornerstones of our Society. At the Tuesday morning technical session you will have the opportunity to learn first-hand about the research program now in progress at our Cleveland Research Laboratory and in cooperating institutions. Operating through financial support made possible by a percentage of our annual dues and industry participation, a loyal group of research people in Cleveland are endeavoring to develop facts that will be of value to all of us. Although the research activities of our Society are coordinated through the Committee on Research, many Research Technical Advisory Committees will hold meetings in Chicago. Watch for the scheduling of these meetings in the Program, and if you have interest, you are welcome to attend these meetings.

Exposition: Without any doubt, this—the 13th—International Exposition held under the auspices of the Society will present the largest display of heating, ventilating and air-conditioning equipment ever assembled in the world. It will be much too large to see in one visit—afternoons and evenings are available, so plan to visit the show on several occasions. The manufacturers will assemble many educational displays. Your trip to Chicago will be made at considerable expense; so make sure you take advantage of the new ideas presented, important product developments, and the opportunity to personally discuss and inspect the latest methods or techniques.

Social: Time for relaxation has been planned too. The Monday Welcome Luncheon and Get-Together Party that evening will be outstanding events. Four years ago at the meeting in Chicago a minister appeared at a technical session one morning just before lunch, and made a lasting impression on those who heard him. As a special favor to the Local Committee, this same minister, Dr. Preston A. Bradley of the world-famous Peoples Church of Chicago, will be the man you cannot afford to miss at the Annual Banquet Wednesday evening.

To those of you unable to come to Chicago, I regret that I will be unable to personally greet you, so I must content myself with this opportunity to express appreciation for the friendly considerations and loyal support which you have extended to me this year.

Sincerely,

John W. James

President
AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS

Chicago Will Have Biggest ASHAE Annual Meeting and Exposition

Dr. Richard Heflebower
Evanston, Ill.

Dr. Preston A. Bradley
Chicago, Ill.

Many committees plan a program with the idea that the momentum created by a strong beginning will be sufficient to carry the program through to a successful conclusion.

Not so the Illinois Chapter Committee on Arrangements! They have invited outstanding speakers to open and close the Society's 63rd Annual Meeting.

Because the Monday Welcome Luncheon is the place for members to meet, a record attendance is expected and no one will be disappointed when they hear Dr. Richard Heflebower talk about *Revolutions in Our Times and What Our Lives Will Be Like in the Next 10 Years.* Dr. Heflebower's predictions of things to come and why engineers (and their wives) will be even more important tomorrow than they are today is a talk everyone will want to hear. He is chairman of the economics department, Northwestern University.

And that's only the beginning! A fine Annual Banquet has been planned. Founder and pastor of Peoples Church, Chicago, Dr. Preston A. Bradley will deliver the banquet address. Well known for his weekly radio program and such books as *Courage For Today, Mastering Fear, Life and You,* Dr. Bradley has chosen for his subject, *Facing The Future.* It can be expected that everyone will find inspiration from Dr. Bradley's talk.

Registration commences February 24. The first technical session convenes February 25 at 9:30 a.m. The Exposition opens at 2:00 p.m., February 25, continuing until 6:00 p.m., March 1.

Complete 63rd Annual Meeting Program

Details of Sessions and Special Events

Directory of Exhibitors and

Floor Plan of Exposition

SEE PAGE 195

COMMITTEE ON ARRANGEMENTS

P. J. Marschall, *General Chairman*
H. G. Gragg, *Vice Chairman*

Honorary Chairmen
H. M. Hatt
S. R. Lewis
Dr. A. C. Willard

Reservations: G. G. Freyder, *Chairman.*

Banquet — G. V. Zintel, *Co-Chairman;* E. B. Boston, W. H. Brackett, Joseph David, N. A. Gregornik, W. C. Kadow, R. W. Reed, I. R. Saunders, M. S. Simon, D. H. Snyder, J. A. Solon, A. G. Sutcliffe, J. F. Tobin.

Get-Together — L. H. Streb, *Co-Chairman;* C. O. Anderson, Thomas Cranage, D. W. Davis, Jr. C. L. Meyer.

Monday Luncheon — C. M. Burnam, Jr., *Co-Chairman;* A. H. Blaker, H. E. Clo, S. F. Rost, Harvey Schoeman.

Ladies' Activities — M. J. Bamond, *Co-Chairman;* R. J. Abramson, L. A. Barron, J. A. Holbrook, W. H. Kramer, A. W. Lippitt, R. W. Van Valzah.

Exposition — W. G. Pennington, *Co-Chairman;* H. F. Abendroth, R. T. Flickinger, J. J. Friedler, Jr., John Kastholm, Jr., L. P. Lang, J. W. Muessig, L. F. Schulein, J. T. Wells.

Entertainment: J. S. Kearney, *Chairman.*

Orchestra, Acts, Etc. — H. E. Anderson,

Co-Chairman; W. J. Abraham, J. J. Floreth, C. O. Pratt, W. A. Stahl.

Ladies Activities — Mrs. H. G. Gragg, *Co-Chairman;* Mmes. H. E. Anderson, M. J. Bamond, M. W. Bishop, C. M. Burnam, Jr., H. J. Couch, G. G. Freyder, E. P. Heckel, Jr., J. S. Kearney, Herbert Kreisman, W. A. Kuechenberg, P. J. Marschall, L. O. Paul, W. G. Pennington, R. W. Roose, R. J. Salinger, J. C. Scott, H. C. Stevens, L. H. Streb, E. R. Teske, G. V. Zintel.

Hospitality: Herbert Kreisman, *Chairman.*

Reception — M. W. Bishop, *Co-Chairman;* R. D. Anderson, A. M. Bladen, G. W. Bornquist, B. L. Casey, H. G. Chapin, Melvin Fakter, J. M. Frank, G. D. Haberer, Louis Hatz, B. H. Jennings, S. R. Lewis, F. W. Luft, Jr., E. N. Patek, S. A Pope, William Shelley, R. W. Stewart, W. T. Walters.

Registration — R. J. Salinger, *Co-Chairman;* A. B. Allen, M. B. Chalfen, M. E. Coobs, O. P. Crose, R. N. Demir, G. R. Healy, E. J. Kurek, G. A. Mansinger, F. W. Riederer.

Inspection Trips — J. C. Scott, *Co-Chairman;* N. E. Bueter, S. H. Rich.

Information — E. R. Teske, *Co-Chairman;* J. B. Hill, S. M. Miner, J. J. Philippi, Henry Seetch, Jr.

Transportation — H. C. Stevens, *Co-Chairman;* S. O. Johnson, J. H. Lazar.

Finance: E. P. Heckel, Jr., *Chairman.* C. W. Blodgett, K. G. Carlson, E. I. Kadlec Jr., S. C. Tarnoff, C. M. Vreuls.

Sessions: L. O. Paul, *Chairman.* Arthur Abrahamson, M. K. Arenberg, M. M. Hattis, C. P. Iseminger, B. A. Krulewitch, H. T. Kucera, W. S. Maxim, J. G. Pecis, D. K. Ridley, J. E. Sorensen, C. E. Tomlin, W. W. Treichler, Jr., A. R. Wallace.

Publicity: R. W. Roose, *Chairman.* L. A. Erickson, E. H. Gage, J. H. Gazlay, T. V. Johnson, W. L. Lowry.

Facilities: H. J. Couch, *Chairman.* C. B. Bendix, A. C. De Smet, Edmund Gelfand, E. H. Gustafson, E. M. Kralovec, Jr., J. P. Lebow, Eugene Rovin, A. R. Thompson, Jr., E. J. Williams.

Heating and Air Conditioning Loads

by H. T. Gilkey*, Cleveland, Ohio

The sole reason for the existence of much of the heating, ventilating, and air-conditioning industry is to produce within any structure the environmental conditions required by man. These conditions may be dictated by comfort and health considerations, or they may be determined by industrial considerations. Whatever the need, however, it falls to the men in this field to design, supply, and install the equipment and the distribution system which will satisfy the need.

The essential first step in the design of any air-conditioning system is determining the load which must be satisfied. Neither equipment selection nor system design can be determined until the load is known.

Committee Organization

One of the Society's earliest activities was to study heating and air-conditioning loads. During recent years, there have been two Technical Advisory Committees, the TAC on Heating Load and the TAC on Cooling Load, which considered the problems associated with load calculation. More recently, a third committee, the TAC on Infiltration, was formed to consider the problems involved in estimating this one component of both heating and air-conditioning loads.

Within the last year the Committee on Research concluded that the problems associated with heating loads and air-conditioning loads should be considered by one committee since they are not readily separable. Accordingly, the three Technical Advisory Committees just mentioned were inactivated and a single Technical Advisory Committee on Heating and Air Conditioning Loads was formed. It is the responsibility of this committee to consider both the winter and summer aspects of factors which affect heating and air-conditioning loads.

No load calculation can be any better than the technical information upon which it is based. Consequently, some of the activities of the committee are concerned with research, the objective of which is increased understanding of the components of heating and air-conditioning loads. The committee is also concerned with the translation of research results into applicable design information.

Research Projects

A current research investigation deals with the infiltration components of heating and air-conditioning loads. One phase of this investigation, conducted under the terms of a cooperative agreement between the Society and the University of Illinois, studied infiltration under both summer and winter conditions in two residences. The paper reporting the results should be available soon.

Infiltration through building entrances has been difficult to estimate. An investigation of this is currently being conducted by the Laboratory. It includes studies of traffic patterns in various types of buildings with various types of occupancy, the length of time doors are open, and the relationship between operation of inner and outer vestibule doors under different traffic conditions. Pressure differential variations in building entrances and the differentials in other parts of the buildings are also being studied. All of these factors are being studied in buildings with different types of doors — single and vestibule swinging doors, power actuated doors, and revolving doors — and under a variety of weather conditions.

These field studies are being coordinated with laboratory studies on scale models of building entrances. If, for instance, the traffic patterns and pressure differentials can be established for a given entrance condition, then by the suitable application of dimensional analysis the air leakage through the entrance can be determined experimentally. The results of these studies will provide engineers with information upon which to base estimates of entrance infiltration thus allowing more precise equipment selection.

Other Technical Advisory Committees are concerned with learning more about specific factors which affect heating and cooling loads. In general, these are in specialized fields of interest such as thermal circuits, heat flow through glass, and weather data. The information resulting from these committees' activities must be translated into procedures for load calculation. Who does this is immaterial, but it must be done, and done as rapidly as possible. With more precise and more rational load calculation methods, heating, ventilating and air-conditioning systems can be designed to be more economical and to satisfy more closely the requirements of controlled environment.

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*Chairman, ASHAE Technical Advisory Committee on Heating and Air Conditioning Loads.

From '36 to '56: Air Conditioning Comes of Age

By Walter A. Grant*, Syracuse, N. Y.

This paper, since it is historical in character, is being presented in the Journal Section in 3 parts, of which this is the second. Here the author covers developments relating to heating equipment; air purification, moving, and distribution equipment; heat exchange surface; refrigeration equipment; water conservation equipment; and automatic controls.

Heating Equipment

While the purpose of this paper is to review progress in air conditioning, the advances made in heating which is indispensable to the basic requirement of temperature control are also properly a subject for appraisal. For, despite the ripe old age of the heating business, there have been very important and significant improvements in products and systems during the past 20 years.

Homes, commercial and industrial buildings are much more comfortable and livable in the winter of 1956 than they were in 1936. While tremendous credit should go to the advances in heating technology recited below, one should not lose sight of the fact that basic improvements have been made in sealing buildings much more effectively from wind and weather through insulation, weather-stripping, moisture barriers, and double glazing. These techniques have complemented the advances in heating, and have greatly simplified the task of the heating engineer.

The developments which overshadow all others in the heating field are the dramatic trends from coal to oil and gas, and from manual to automatic firing.

Residential Heating: In 1936 only 30 percent of new heating equipment sold was automatic. Today, the figure is closer to 99 percent, with about 65 percent of the installations gas and 34 percent oil. In 1936 most equipment was designed for coal firing and then modified to use gas or oil, although a few companies pioneered in designs specifically for these fuels. With the northward and eastward expansion of gas pipelines and the establishment of broader crude oil distribution, many equipment manufacturing companies in the mid-thirties swung onto the band wagon.

Results have been startling. The 54 in. diameter gravity *octopus* has given way to equipment 24 in. wide by 34 in. deep. The coal bin is now the hobby shop. Miniaturization has created exceptional versatility with regard to location. Slender, vertical or horizontal, upflow or downflow furnaces may be placed in utility closets, crawl spaces, attics, or garages, as well as in the basement. Much greater emphasis has been placed on styling since the furnace has been liberated from the basement to the living areas of the home. Judicious use of color is seen, with pleasing lines and general aesthetic appeal.

Twenty years ago most furnaces were cast iron. The shift has been strongly toward steel as welding techniques and the cost picture have improved. The typical 1936 furnace had a radiation shield for its major insulation. Today, glass fiber materials and reflective metal surfaces are performing more efficiently and at less cost to reduce casing heat losses. Heat exchangers are more efficient, and ceramic coatings or aluminized or stainless steel provide added protection from high temperature corrosion.

The large cast-iron boiler has been scaled down to a fraction of its former size. For residential heating, steam has given ground to hot water, and gravity hot water has been largely replaced by forced circulation. A pump in the water line permits installation of the boiler in almost any location and achieves more rapid and even heating response. Another sign of progress in the past 20 years has been the retirement of the old-fashioned, unattractive, poorly performing radiator. Distribution of heat is now accomplished by convectors or baseboard which perform inconspicuously and better. Attention to the design and location of these devices has resulted in a reduction of floor-to-ceiling temperature stratification, thus greatly improving comfort conditions.

Much has been learned since 1936 about conditions necessary for comfort in residences. Within the past 10 years the industry has developed perimeter loop systems which largely prevent cold floors and appear to be gaining favorable acceptance.

The past decade has brought an unusual amount of activity in panel heating, both for homes and large buildings. ASHAE research has been in the forefront in advancing basic knowledge in this field. Design and installation techniques have been brought to a high degree of perfection for floor, ceiling, and wall panels. The most popular form in residences has been the heated slab, installed directly on the ground with imbedded steel or copper pipes, edge-insulated to prevent undue heat loss. The control problem has been difficult, due to thermal lag and capacity, but progress has been made in improving control systems for this duty. Considerable work has also been done on ceiling panels with pipe or tubing imbedded in the plaster.

Many of these advances are a direct result of better cooperation among manufacturers through industry research, and industry- and association-sponsored university research. The publication in manual form of research results and the increasing use of industry standards has been of material benefit to all parties.

A phenomenon arising in the wake of cheap public power has been di-

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*Vice Pres., Research and Development Division, Carrier Corporation. Member of ASHAE.

For presentation at the 63rd Annual Meeting of the American Society of Heating and Air-Conditioning Engineers, Chicago, February 1957.

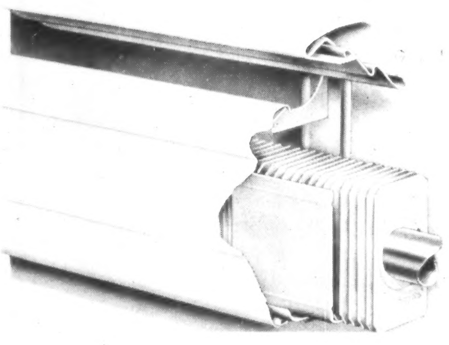


Fig. 16 *(right)*—Unobtrusive radiant and convective baseboard heating has superseded the ugly radiator, and gives superior results

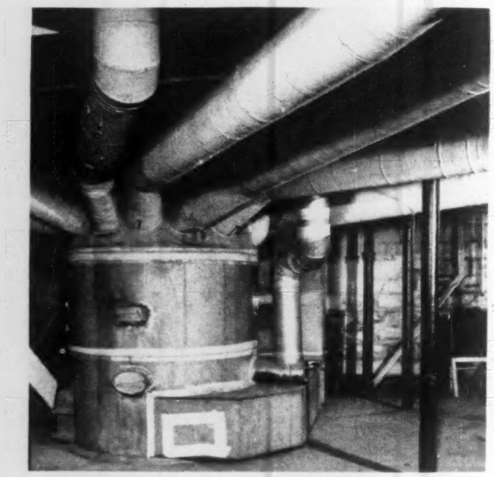
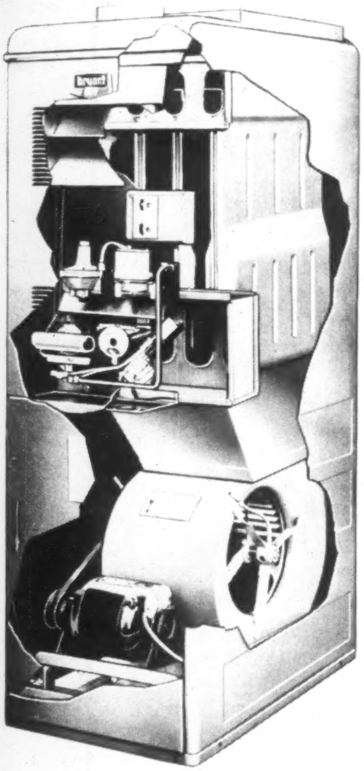


Fig. 14—Typical gravity warm-air furnace of the middle thirties, familiarly known as the Octopus

Fig. 15 *(below)*—Modern gas-fired forced warm air heating unit for homes



rect electric heating of homes; and there are thousands of such homes thus equipped in the TVA areas and in the Pacific northwest.

Commercial and Industrial Heating: Commercial heating has developed along lines similar to residential heating. Equipment dimensions have been reduced, and a greater variety of types and sizes is being offered. The most pronounced trend has been the use of factory-assembled units to reduce the labor of field-assembly and installation.

New industrial building concepts have had an important effect on heating techniques used in industrial enclosures. The broad expanses of the modern one-story building have posed both heating and ventilation problems not present in multi-story factories, particularly in the windowless central sections of these one-story plants. In consequence, the old heat diffuser has evolved into a heating and ventilating unit.

Development of new combustion chamber materials, stainless, aluminum-coated, and ceramic-coated steel, has made it practical to develop automatic self-contained direct-fired heating systems of all sizes, with significant savings in first cost. A major impetus to the use of direct-fired industrial equipment has been the tremendous increase in the use of fuel oil and natural gas.

This trend has carried over into boiler plants. Built-up boiler plants with field-installed fire brick and structure have given way to all-welded packaged boiler-burner units (Fig. 17) delivered to the site complete and ready to fire with merely the addition of fuel, power, and flue.

Air Purification, Moving, and Distribution Equipment

Air Cleaning: By the mid-thirties the industry had come a long way toward adequate air cleansing. Early filtration methods included an array of spray nozzles blowing across the stream of air. By varying the temperature of the water it became possible to obtain good humidity control, but the method was not effective in separating smudging dirt from the air.

The bag-type strainer and the dry filter next evolved were more efficient but offered substantial resistance to air flow. Both cleanable and automatic viscous filters developed during this period using the impingement principle proved to be effective on large dirt particles, less effective on fine dirt, and ineffective on smoke. Inexpensive throwaway filters appeared on the market which eliminated the necessity for frequent washing and re-oiling.

In the middle thirties, Westinghouse developed the electrostatic cleaner, a modification of the Cottrell precipitator, which removes all sizes of dirt, including smoke. Electrostatic precipitation was also introduced in combination with dry filter media.

Dry filters have been recently developed which strain out materials as fine as smoke and radioactive fallout. These offer higher resistance to air flow than the electrostatic, but are less expensive.

There has been a gradual acceptance that high quality cleaning reduces damage to goods from soiling and costs of washing, dry cleaning

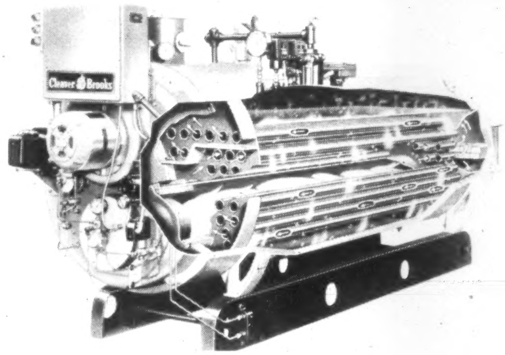


Fig. 17—The automatic gas- or oil-fired packaged steam generator has greatly simplified boiler installations for medium capacity heating of commercial and industrial buildings

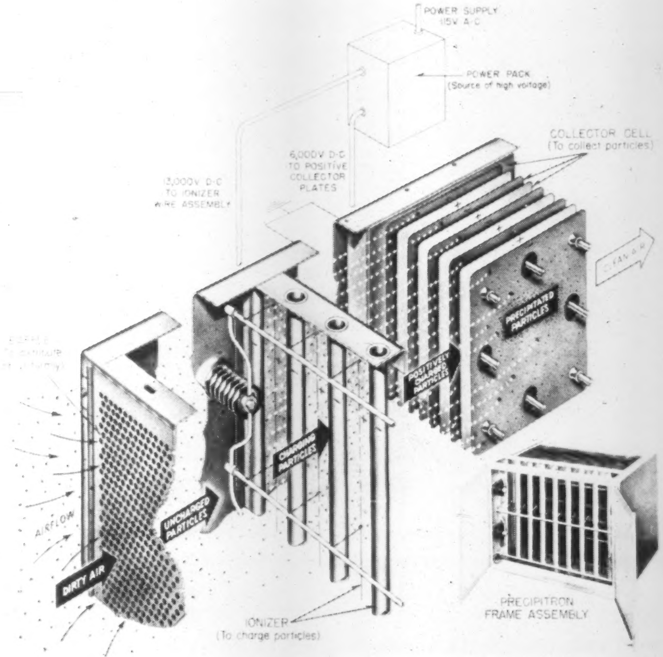


Fig. 18—The electric precipitator was the first air cleaner to remove efficiently fine dust, soot and smoke from atmospheric air used for the ventilation of buildings

and redecorating due to smudging, caused by the carbonaceous particles in smoke and soot floating in industrial communities.

A large percentage of the population suffers from some form of nasal allergy, usually ragweed pollen or house dust. Here again, effective removal techniques have been developed in the last 20 years which relieve the condition in practically all cases while the occupant is indoors.

Odor Control: As stated under Basic Knowledge, much work in the realm of basic science is still required on the physiology of odors. However, the application techniques of using activated charcoal to absorb odors from the air have been greatly improved in the past 15 years, thanks primarily to pioneering by the Connor Engineering Corp. Most of the mystery has been taken out of odor control by putting it on an economic basis, whereby capital and operating costs of heating and cooling equipment are reduced through the reprocessing of recirculated air with a consequent reduction in the amount of ventilation air taken into the building.

Particularly during the past decade there has been tremendous promotion of volatile additive perfumes, many of them advertising *activated chlorophyll* and other reminders of outdoor freshness. The precise action of these materials on odors has not been definitely established. While their chief utility is to chase away kitchen and bathroom odors in the home, there has been considerable use for them in air conditioning systems. In some instances there has been user satisfaction, in others the practice has been abandoned after a year or so of trial.

Fans: By the start of the 20-year period under review, some experts believed that fan design and performance had reached their zenith. In the last 10 years, however, there has been a substantial resurgence of design effort, coupled with manufacturing methods, better to streamline flow. Spinning and die-forming, together with newer welding techniques, have contributed to quieter performance and higher efficiencies, which users have loudly demanded.

The trend has been toward the backward curved blade centrifugal fan with its inherently higher speed characteristics. Where peak performance must be maintained with minimum horsepower, airfoil blade centrifugals are becoming important, despite increase in fan size and cost. Another advance has been to control fan performance with variable inlet vanes, which not only permit constant speed motors, but result in better efficiency at part load than by dampering at the fan outlet.

Great strides have been made in the use of axial flow fans. Their main applications are in low pressure applications where large volumes of air must be moved.

Air Distribution Equipment: There have been few improvements in the fabrication of conventional round and rectangular ducts made of metal, although there has been increasing use of aluminum in place of galvanized steel. Special purpose ducts and conduits, with or without insulation and/or sound-proofing, have been introduced in substantial variety. A round spiral conduit with a watertight seam made by machine from continuous strip has proved especially suitable for high-velocity systems because of its low leakage rate, absence of distortion due to pressure, and savings in cost. Used with this conduit are special fittings,

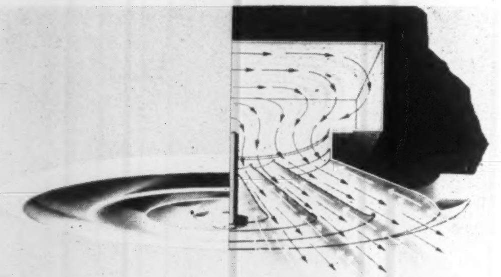


Fig. 19 (left)—Ceiling diffusers demonstrated 20 years ago that air outlets could be pleasing to the eye as well as effective in distributing air

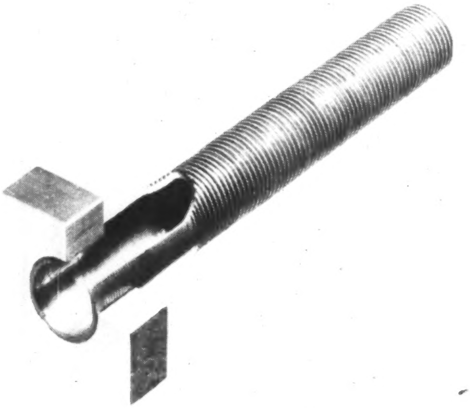


Fig. 21—Pressure-formed extended surface tubing for shell and tube heat exchangers. This was one of the industry's major engineering advances of the past 20 years

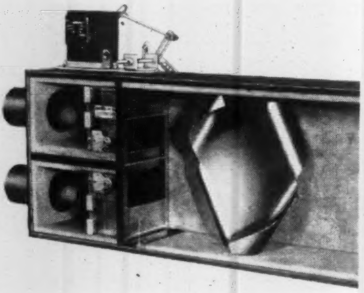


Fig. 20 (left)—The economic advantages of high-velocity distributing systems necessitated the design of air diffuser control units to regulate air velocity, volume and noise level. Picture of double duct control unit shows (l. to r.) entering ducts, motor-operated proportioning dampers, mixer, sound absorbing chamber, and outlet opening

including ells, tees, and take-offs, suitable for multi-story application.

Composition ducts and conduits found considerable use during the war when steel and aluminum were unavailable. They have attained limited acceptance in residential and small commercial applications.

Knockdown ducts and conduits are a result of the recent expansion in the residential market, coupled with the *do-it-yourself* craze in home crafts. Round or square ducts complete with fittings are shipped in pieces for assembly by the man of the house. Some of these systems employ a multiplicity of small conduits rather than mains and branches of different sizes.

The mid-thirties saw the introduction of a great variety of room air distribution devices. Of substantial importance was the development of ceiling diffusers (Fig. 19) of pleasing appearance designed to distribute air uniformly and mix it thoroughly before introduction to the breathing zone. This was paralleled by similar work on sidewall grilles. Where large volumes of air were to be handled draftlessly, the perforated ceiling distribution method filled the bill. Much more attention has been paid in recent years to control of air direction to suit the needs of the occupant. Well engineered regulation of volume and introduction of sound-absorbing material to cope with fan and regenerated noise have been important results of research since 1936. Design improvements have also been made to minimize dirt streaking of ceiling and grille surfaces. Finally, development of single and dual air outlets combined with automatic dampering and noise control has been a recent and important contribution.

Heat Exchange Surface

Heat exchange surface and equipment are important in any review of advances in air conditioning, since they represent 30 to 50 percent of the value of the end product.

By 1936 the industry had abandoned entirely the use of cast-iron blast heating surface and pipe coils, in favor of light weight finned coils, first marketed in the early twenties. The tubing was usually copper, and the spiral or plate fins were copper or aluminum.

Finned coils for cooling started to displace spray washers in the early thirties. Washers did not prove satisfactory in multi-story buildings, since the open spray system created hydraulic problems, required excessive pumping power, and was subject to contamination from impurities in the air. The closed chilled water system employing finned coils offered measurable advantages in performance and cost. Another factor which promoted coils was the development of direct expansion systems employing the fluorinated refrigerants.

Early finned coils used soft solder for joining tubes and return bends. During the latter thirties high temperature bonding techniques were perfected using silver solder and brazing compounds, substantially increasing tube tightness and life.

An important development in heat exchanger design during the war was the sandwich coil, employing aluminum sheet stock without the use of tubing. This design was made practical through oven brazing techniques, whereby formed plates are joined into a rigid box structure. To date these coils have been used primarily for aircraft heat exchangers.

During the past 10 years there has been a marked change in the choice of materials for fins and tubing. After the war, the price of aluminum relative to copper has steadily decreased on the basis of dollars per Btu transferred. Consequently, major research has been invested in developing all-aluminum heating and cooling surfaces.

A revolutionary development in heat exchanger surface was the introduction about 1937 of the pressure-formed-fin tube. This has had a tremendous impact on refrigerating practice because it cut in half the size of shell and tube coolers and condensers. The transfer rate of the new finned tube (developed by Carrier and Wolverine) is about 2½ times that for plain tubes. As shown in Fig. 21, the fins are about 1/16 in. high and number from 16 to 25 per in. They are pressure-formed from the tube itself, cut to length, the tube ends are belled out, and the fin shaved off the belled end. The tube, which is rolled into the tube sheet in the same manner as bare tubing, may be removed in case of failure since the diameter over the fin is slightly less than the hole in the tube sheet. This type of tube ranks with the development of the centrifugal refrigerating machine and the fluorinated refrigerants as a major advance in the art.

A further trend in surface and coil design has been the optimization of geometry, which includes the number of fins per inch, fin thickness, tube spacing in both directions, the outside/inside surface ratio, and other physical optimums. Here the purpose has been to achieve the most economical usage of material, in order to transfer the greatest number of Btu per dollar invested. It is a characteristic of heat exchangers that the labor cost is small compared to the material cost. This has permitted considerable design and production ingenuity. The number of varieties of plate fin and spiral fin, not to mention interrupted fin, spike fin, and other types, is evidence of the effort and progress made toward reduction in material costs.

Refrigeration Equipment

Although refrigeration is not air conditioning, the rise of air conditioning to a multi-billion dollar industry would have been impossible without it. By similar token, refrigeration would still be in the dark ages were it not for air conditioning.

All the essential ingredients for design of both reciprocating and centrifugal compressors were known for many years prior to 1936. Progress during the past 20 years has not been in the nature of revolutionary change, but rather of improvement and refinement, with substantial cost reductions due to design economies and volume production.

Positive Displacement Compressors: Of the 2 types of positive displacement compressors — rotary and reciprocating — the rotary compressor can be dismissed rather briefly. Small rotaries, developed for refrigerators and using sulfur dioxide, have been redesigned and improved for use with low or high pressure fluorinated refrigerants. In the past 5 years there has been some activity toward design of larger fractional horsepower rotary compressors suitable for room air conditioners. Large methyl chloride rotaries developed 20 years ago are no longer built, but a more recent model is available as a booster compressor for low temperature refrigerant-12 staged systems.

The majority of positive displacement compressors are reciprocating. The most important evolution in these compressors has been increase in rotational speed. In 1936, compressor speeds had reached an average of between 400 and 600 rpm. Adaptation of automative engine design principles made attainment of higher speeds contingent on improvement in pressure-operated suction and discharge valves for acceptable performance and life. The high-speed radial compressor introduced by Airtemp in the thirties spurred considerable research and development, but by 1945 there were several compressors available up to 100 hp operating at 1200 to 1800 rpm. Today much work is in process to perfect compressors to run at 3600 rpm, the maximum speed attainable by a 60-cycle two-pole motor.

Other design achievements included: (1) improvement of rotary shaft seals for open compressors to reduce service and maintenance costs; (2) pressure oiling systems, to insure adequate lubrication of moving parts; (3) improved system and piping design and installation techniques, to insure oil return to the crankcase, and minimize the effect of contamination in the system; (4) improved manufacturing techniques with respect to cylinder surface finish, dimensional tolerances, alignment, and balance, contributing to longer life; and (5) capacity control methods.

All these improvements might be labelled *tail wags dog*. Prior to the '30's, compressor design progress followed commercial and industrial ice machine requirements. Since then, design technology has been stimulated intensely by the domestic refrigerator and air conditioning. Certainly more progress has been made in compressor design during the last 20 years than in the previous 50. The benefits of these improvements have been since returned to the commercial and industrial refrigeration field in terms of design improvements for their specialized machinery.

Another inevitable trend, by no means new in principle, but relatively recent in acceptance, has been conversion of the industry to hermetically sealed units. Historically, this began first with domestic refrigerators, in General Electric's monitor top in 1927, so that by 1938 all new production of refrigerators by the industry was of the hermetic type. The next step included larger fractional horsepower compressors, and by 1954 room air conditioner compressors were entirely hermetic. Now there is a strong impetus to convert entirely to hermetic compressors in all sizes.

Motor winding and other components operating in a refrigerant atmosphere, possibly contaminated with water, air and oil, create difficult chemical and electrical problems. Much work has been required to overcome these problems, not the least of which was development of winding insulation more resistant to the contaminants. Sufficiently long life and freedom from maintenance have now been achieved to permit the hermetic compressor to supersede

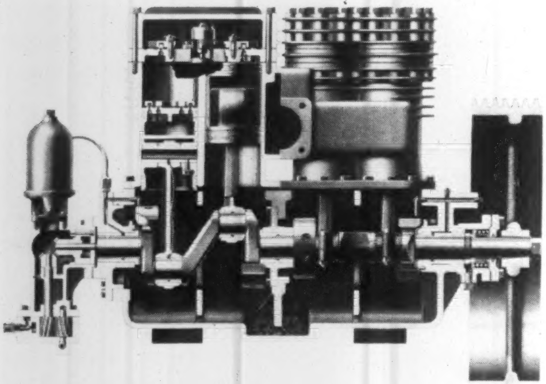


Fig. 22—Belt-driven reciprocating refrigerant-12 compressors such as these were typical of design practice in 1936

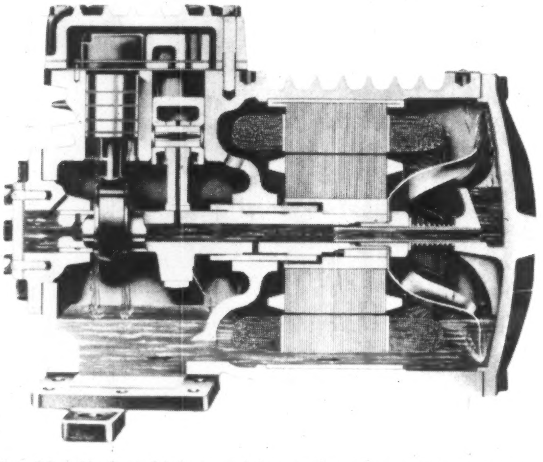


Fig. 23—Modern high-speed hermetic reciprocating compressor for room air conditioners

the open machine. The lower manufacturing cost of the hermetic permits another contribution by the industry in bringing the consumer a better and lower cost product.

Centrifugal Compressors: The principal change in centrifugal compressors in the last 20 years has been reduction in manufacturing cost through larger volume, improvement in performance, and hermetic design. It should be recalled that, although Carrier introduced the first open centrifugal refrigerating machine in 1921 and the first hermetic in 1930, it was not until the late thirties that 3 other companies entered the business. Additional companies have offered models in the last 2 years.

So far, the economic place of the centrifugal compressor has been in sizes well above 100 tons, although units are available down to 35 tons and up to about 3000 tons. Compressors are typically one or two-stage for air conditioning. Above 300 or 400 tons capacity in a single unit, the centrifugal has completely superseded the reciprocating compressor, which up to 1937 was built in sizes for refrigerant-12 up to 700 tons.

In 1938 Trane introduced the first direct-driven hermetic unit, and during the past few years there has been a strong trend toward this type of machine, due to lower noise level, lighter weight, and ease of attaining fully automatic operation.

Water Chilling Units: For many years it has been an industry problem whether to supply components selected separately and assembled in the field to a tailor-made design, or to use water chilling units in which all components were designed and assembled at the factory. Field assembly has always been fraught with the hazards of inferior piping design and installation practices, which can be held under closer control with factory-assembled units. The past 5 years have seen a trend toward factory-fabricated and assembled reciprocating water chilling units. Complete units always have been furnished with centrifugals.

Heat-operated Refrigerating Machines: The aqua-ammonia absorption system was invented in 1815. Since that time there have been a great many attempts to improve the absorption cycle, some of which have employed other refrigerant/absorbent combinations.

Most attempts to develop other types of heat-operated cycles have met with only limited success. Steam jet refrigeration has been often used for specialized applications, but has not enjoyed tremendous popularity for air conditioning because of the large steam consumption and size of cooling tower required.

Another attack has been made by using internal combustion engines burning natural gas to drive compressors in a conventional compression cycle. While a number of installations were made during the thirties, high maintenance costs, noise levels, and other objectionable features resulted in decreasing use. During the last 3 years there has been a renewed effort to solve the need of the gas utilities for a summer gas air conditioning load. Inasmuch as gas engines have good operating economy, considerable development expense is being invested to improve reliability, automatic starting, and control, lengthen operating life between overhauls, and reduce noise to an acceptable level.

In 1937, Williams Air-O-Matic developed a water cooling unit for air conditioning using halogenated compounds in capacities of 15 to 35 tons. This machine was marketed for a few years, but was discontinued about 1952. In 1940 Servel introduced an absorption air conditioning unit employing water as the refrigerant, and an aqueous solution of lithium bromide as the absorbent. The operating efficiency of this combination is substantially better than the aqua-ammonia cycle. These hermetic water-cooled machines were introduced as all-year heating and cooling units for residences and small commercial installations, in capacities of 3 to 5 tons. Mechanically, great ingenuity was used in overcoming the problems of a high vacuum machine using water as the refrigerant. In recent years strides have

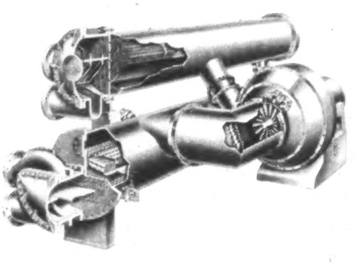


Fig. 24 *(left)*—Hermetic centrifugal water chilling unit for air conditioning (1956), showing direct-driven, 2-stage compressor, shell and tube condenser (above), and evaporator (below)

been made towards simplification and cost reduction through direct firing and use of the same coil for both heating and cooling.

In 1945, Carrier introduced the first commercial lithium bromide absorption water chillers for air conditioning, in capacities from 100 to 700 tons and operating on low pressure steam. Completely automatic, these units adjust to any load from 0 to 100 percent, and their low noise level and freedom from vibration permit installation wherever space and steam are available. Recently, Servel introduced a 25-ton water chilling unit.

The absorption machine offers substantial operating cost advantages in many areas, and permits utilization of otherwise idle boiler capacity during the cooling season. The author predicts that the development of the lithium bromide/water absorption machine will be viewed in retrospect as one of the really important advances in the technology.

Refrigerants: The outstanding development in the field of refrigerants during the preceding 20-year period was the invention of the "Freon" family of fluorinated hydrocarbon materials by Midgely and Hene in 1931, and their subsequent development by Kinetic Chemicals. While refrigerant-11 and refrigerant-12 started to gain commercial importance in centrifugal and reciprocating compressors respectively prior to 1936, their real impact on the technology of the industry has occurred during the past 20 years.

For reciprocating machines, the fluorinated refrigerants spelled the death knell to methyl chloride, carbon dioxide and sulfur dioxide, in all categories of equipment from refrigerators to the largest units. Of the refrigerants formerly of commercial importance, only ammonia continues strong today, mainly in the food processing and storage industry, due to existing investment in plant and inertia in taking advantage of modern techniques. For the first time, completely safe and acceptably stable refrigerants were available which gave good operating efficiency and permitted the design of relatively light weight machines. Design techniques had started along this approach with methyl chloride several years earlier, but its flammability and poisonous nature greatly limited application. The advent of refrigerant-12 permitted development and improvement of these compressors to proceed swiftly, and was a major factor in making feasible the self-contained units and room air conditioners we know today.

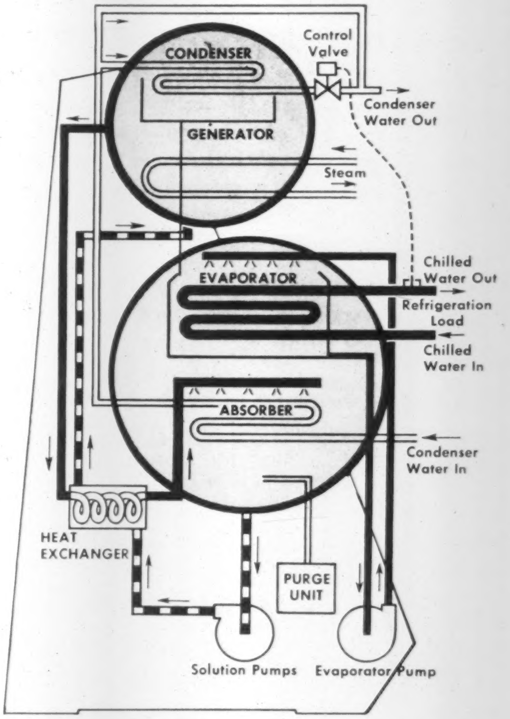


Fig. 25 *(right)*—Cycle diagram of lithium bromide absorption water chilling unit for air conditioning

The important contribution of refrigerant-11 in centrifugal compressors was toward cost reduction. Together with other improvements it permitted to be done in 2 stages of compression what required 5 or 6 stages with the predecessor refrigerant, methylene chloride.

During the past 20 years many other fluorinated refrigerants have been developed, and a few have been commercially successful. These include refrigerants-113 and -114 for centrifugal compressors and 22 for reciprocating compressors. Low boiling point materials such as refrigerants-13 and -14 were made available for low temperature process refrigeration. In 1946, Pennington and Reed invented an azeotrope of refrigerant-12 and difluoroethane for use in reciprocating compressors (presently designated as refrigerant-500).

By permitting design of high-speed machines and direct expansion systems these new refrigerants contributed importantly to lower costs for the entire refrigeration cycle, thereby bringing summer air conditioning within reach of more and more people.

Dehumidifying Processes: The processes of dehumidifying air by contact with moisture absorptive brines or adsorptive solid dessicants had been developed into commercial equipment in the late twenties and early thirties. During the period under review, they proved not to be competitive with refrigeration for comfort air conditioning, although some installations were made; but they found a special niche in industrial air conditioning where low humidities are required for product or process. Major strides were made in improving equipment performance and durability.

Water Conservation Equipment

During the early days of air conditioning the pressure to conserve water was not particularly great. While large installations had for some years used cooling towers, small air conditioning plants used city water directly and disposed of it to the sewer.

With the development of the fluorinated refrigerants in the early 1930's, volume marketing of small air conditioning units began and water conservation became imperative. In many areas local ordinances were enacted requiring conservation equipment even for small users, and in many other localities the cost of water became enough so that it became profitable to save it despite the heavier capital investment. In some cities sewers were overloaded, resulting once more in regulations forcing water saving devices.

None of the 3 major types of water conservation equipment is new in principle. The shifting trends in their use reflect mainly design improvements and modifications, and heavier economic pressures.

In cooling towers, there has been a trend toward forced and induced towers and away from gravity types with their uncertain performance and large size. Development of crossflow fills have reduced tower height significantly, and progress has been made toward lower noise levels and reduced water carryover losses. In the realm of small towers much effort has been placed upon manufacturing standardization, cost reduction, and increase in durability.

The evaporative condensing principle, whereby water is sprayed upon the condensing surface and heat is dissipated by evaporation of part of this water into air, had been used for many years with gravity ammonia pipe coils. In the early 1930's forced air evaporative condensers were employed in steam ejector cooling units in railway passenger cars. The principle was adapted to refrigerant condensers in the mid-'30's, first by modifications of fan coil units, and later in built-up sprayed coil assemblies. Compared with a cooling tower, the evaporative condenser usually permits significant space and cost savings. Its use however has been confined to smaller tonnages and high pressure refrigerants, due to the problems and cost of running large inter-connecting refrigerant lines between compressor and condenser.

Contamination of recirculated water has proved to be an inherent problem with both cooling towers and evaporative condensers. Metallic parts become corroded, scale is deposited from hard water, and frequently algae accumulate objectionably. During the past 20 years a great deal has been learned about water treatment. At the same time, water problems have provided a stimulus for the development of the dry surface condenser.

Dry condensing is not new either, although its popularity is relatively recent. Substantially larger than either the water cooled or evaporative condenser, it frequently offers improved system costs wherever water must be saved, and definitely lower maintenance costs and less operating nuisance. The normal spring and fall service calls to start up and shut down for the season are eliminated. The air condenser has been used in room air conditioners for 20 years. Within the past 5 years, its growth into the small residential and commercial air conditioning market has been astounding, from practically zero in 1951 to more than 50 percent of the market today. For 24-hour operation, as in residences, operating costs are competitive with cooling towers and evaporative condensers, due to the drop in outside temperature at night.

Automatic Controls

Improvements in automatic controls during the past 20 years have occurred in many directions. They include greater sensitivity of thermostats and controllers, true modulation and positive positioning of control valves and dampers, and better sizing and port design of control valves. The size of valve and damper actuators has been reduced and their power increased. In response to consumer demand, the appearance of thermostats and other in-space controllers has been greatly improved.

A wider variety of control devices is now available. Better understanding of their application has resulted in pin-pointing their selection to achieve closer control of temperature and humidity. There has been an increasing trend toward individual room control. Other improvements include automatic use of outside air for cooling economy, and solar and outdoor compensation for building exposure to sun and wind.

Sensitivity, accuracy, simplicity and reliability have been improved by the introduction during the past 8 years of electronic sensing and control. The broader use of remote indicators and control devices has encouraged the use of data control centers where a lone operator may check temperatures, pressures and relative humidities in all parts of a building, start and stop fans, compressors and pumps, and readjust dial settings as required. Better manufacturing, inspection, and testing techniques have improved the cost and reliability, and have reduced maintenance.

[*In the next (and concluding) portion of this paper attention will be turned to Air Conditioning System developments in the last 20 years. Also the author will look into his crystal ball to see what the future holds.*]

Summer-Winter Comfort Ventilation for Industry

By B. R. Small[*], Pittsburgh, Pa.

Mechanical ventilation is a term that takes on new importance as manufacturing processes advance and as buildings become longer, wider, and hotter. But it is a field that has been overshadowed by the tremendous surge of air conditioning.

Industry is placing confidence in mechanical ventilation as never before. Industrial architects are burning time-honored bridges behind them in one new plant project after another as they turn to partial or full mechanical air change — that is, to controlled ventilation.

If the art of ventilation can meet this challenge and continue to satisfy new and changing requirements, then industrial buildings will continue to become more functional, economical, healthful, comfortable, and better places in which to work.

Since World War II, industrial ventilation has contributed in good measure to the gradual disappearance of louver monitors, ventilation courtyards, multi-story buildings, and other traditions. Even ventilating sash and ventilating doors as natural draft inlets are debatable issues, as is window glass itself. In its place, solid walls with one or two continuous bands of plastic siding are popular. Motorized roof exhaust ventilators no longer fully solve all summer heat problems. Forced outdoor air supply and forced air circulation are the modern trend.

This discussion excludes the air-conditioned plant, likewise the natural-draft, gravity-ventilated buildings. In between these 2 extremes are the plants that this discussion is concerned with: plants that comprise the largest segment of the national economy; plants for assembly, tool and machine manufacturing, machine products, ferrous and nonferrous foundry products, metal working products, food products; and other products with high cleanliness requirements.

Plants need lots of cooling air today just as they need lots of cooling water. There are increasing amounts of heat release from larger machine tools, more motorized operations, heavier illumination and widespread hot metal operations.

Somewhat drastic ventilative measures are required in today's large, wide factory buildings because working areas may be far away from ventilating doors and windows. Dead air conditions often prevail and man-cooler fans are not effective; there is no cross ventilation, and exhaust ventilators scattered over broad roof expanses may fail to benefit the men down on the working floor. In most cases, the answer to this problem lies in mechanical air supply.

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As the program of this Symposium suggests, this is also a time of great industrial hygiene progress. Plants are cleaner and more healthful because of better collection and exhaust of dust, fumes and gases. With this atmospheric clean-up, many buildings have a deficiency when winter comes because they are air-bound, many dangerously so. This negative pressure differential causes sluggish hood operation, not to mention cold drafts. Again, the answer is to provide mechanical air supply.

Hence the theme of this study: a reminder that air supply is a round-the-calendar need, for relief in summer, and for air make-up in winter. Many of you are installing make-up air systems and have done so for years. Those of you who have adopted them for summer comfort ventilation have perhaps found dramatic results. Both are here to stay and will probably multiply like the proverbial rabbit.

How to take this air supply and obtain the greatest usefulness from each 1000 cu ft during all 4 seasons is an interesting subject. The big pay-off in summer, all people agree, lies in air motion.[1]

Dr. Lucien A. Brouha[2] emphasizes its value by stating:

> Lack of air movement in a comparatively warm atmosphere increases the physiological stress due to the fact that the layer of air immediately surrounding the body is heated to body temperature and becomes nearly saturated. When the air moves at an adequate velocity these conditions are corrected, and the evaporation of sweat, and therefore, the cooling process, is improved. Consequently, the total physiological stress is reduced and lower heart rates and lower body temperatures are maintained.

Let us consider methods to use the same equipment for summer and winter. The installation costs can be charged to two categories of benefits.

In speaking of comfort ventilation, one might well visualize it as refined heat relief, though under favorable conditions it can actually be more pleasant than outdoors. Though a poor substitute for air conditioning, comfort ventilation is a vital step to sustain the level of production and good will during periods of summer heat stress. It is no cure-all and might be termed Step No. 3 in a heat control program. Step No. 1 consists of heat removal by exhaust means. Step No. 2 is to confine all radiant heat at hot surfaces by reflective shields or curtains.

Within the comfort ventilation category, nearly all problems can be divided into 2 common classes, namely:

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For presentation at the Industrial Ventilation Symposium, at the 63rd Annual Meeting of the AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS, Chicago, February 1957.

[1] Exponent numerals refer to References.

Class A: Applications with distributed heat loads, *i.e.*, severe motor loads, hot machines, strong illumination, and heavy population coupled with poor cross circulation, inadequate air inlets or low roof height. Here, a reasonable air motion for those seated is 50 fpm, about 100 fpm for those standing and higher if the men move about, or exertion is severe. Enough air should be distributed to limit the rise to about 2 deg from grille to workman as a reasonable value. This class requires broad floor coverage, maximum air distribution, moderate air volumes, and medium-height grille location.

Class B: Work conducted in close proximity to hot objects, *i.e.*, furnaces, ovens, hot metal, heated machinery, kilns, hot tanks and similar conditions. Such areas are usually scattered and few in number. Spot cooling or local area cooling is needed with 2000 to 8000 cfm per man and 200 to 1000 fpm velocity at the man to increase his body evaporative cooling with not more than about 3 deg temperature rise from grille to man desired; grilles are usually located near the men and close to the floor.

A very revealing picture of spot cooling (so called Class B) reads like this:

> Long ago, I was called upon to cool the men who press men's clothes in Chicago *sweat shops*. These men perform strenuous physical labor, hours on end, close to the steam-hot presses. Engineers had tried to cool the entire room or zone. Fans in walls or windows, forcing air in large volumes along the sides and against the backs of the press-operators, did little good and seemed usually to be harmful.
>
> I provided fans and ducts and automatic temperature control of the air delivered, but I delivered this air directly toward the face and chest of the presser. Indeed, since he could control its direction and velocity, he looked happier and was happier, and he pressed more clothes in a better way than ever before.[3]

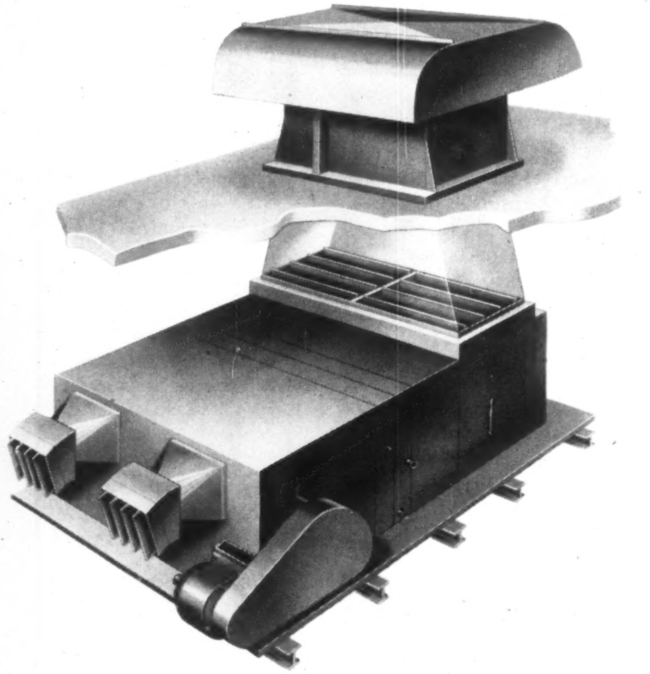

Fig. 2—With heaters in the trusses, it is simple to go up through the roof for outdoor air. Unit furnishes (*a*) make-up air tempering, or (*b*) summer cooling

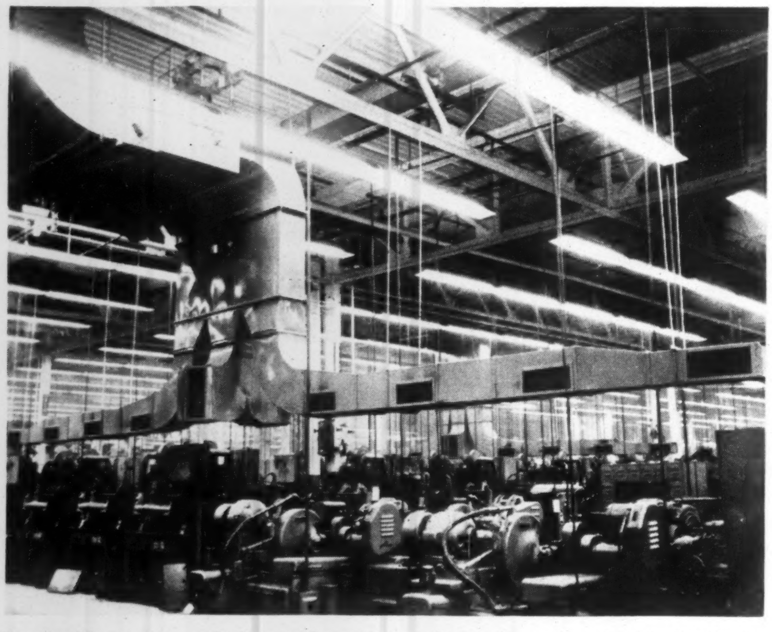

Fig. 1—Blower-type unit heater for summer air supply equipped with distribution duct and adjustable grilles

Three popular basic designs of summer-winter systems are as follows:

1. Blower type unit heaters with distribution duct and grilles.
2. Roof intake ventilators with steam coils and ceiling diffusers.
3. Central air system with distributing ducts.

Blower-type unit heaters are very economical and well-suited for fresh air supply in summer and can produce maximum air circulation when properly equipped with a distribution duct and perhaps 6 to 12 adjustable grilles (Fig. 1). If the heaters are in the trusses, then it is simple to go up through the roof for outdoor air (Fig. 2). Adequate summer ventilation will always require closer spacing of the units than is needed for winter heating since interiors of buildings have very small roof heating losses.

A second type of summer-winter air supply unit is the roof intake fan arranged to force air down through steam blast coils, all tied into and suspended from roof steel framing. This unit will probably grow in favor, but is still relatively new. For summer comfort ventilation, a suitable ceiling diffuser should be specified with an air pattern that is readily adjustable at will.

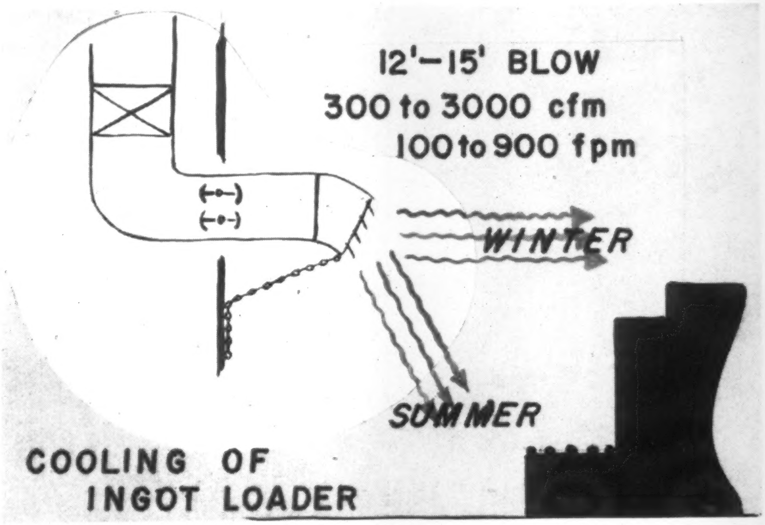

Fig. 3—Spot cooling with volume and directional control

A third type, moderate-sized central station duct systems, are preferred in some plants for trouble-free, heated air make-up in winter, and for air circulation in summer. They are ideally adapted to future air conditioning. Ductwork can be carried overhead along columns or within trusses or else placed underground in reinforced concrete pipe.

Economies are attained by using high fan and duct ratings. Typical ratings are 2600 fpm outlet velocity and 3000 fpm initial duct velocity. These provide surprising quietness of operation. Even 4000 fpm in a 6-ft diameter concrete pipe has worked out very well.

This type requires by far the least amount of operating attention and replacement items. Here, one fan, one temperature control, and one group of steam coils, steam traps and air filters are all grouped together at one point where access is more convenient and closer inspections can be made than is possible at 4 or 5 scattered locations. In Aluminum Company of America's experience with 12 central systems totalling 1,100,000 cfm, coil freeze-up troubles are extremely rare though much credit is due to the plant maintenance people.

Central systems are better adapted to any future developments. Should manufacturing operations later require greater heat relief, these central systems can easily serve an air washer for evaporative cooling as part of a so-called split system.[4] Furthermore, for industrial air conditioning, one can add cooling coils and extend the ductwork as needed at small cost.

So far, the value of adequate outside air supply has been emphasized. Adequate air movement is equally important, many will insist it is more important. However, one differentiates between (1) general circulation in Class A work and (2) local air motion in Class B situations.

Obviously, if air motion is to be effective and provide cooling benefits by increasing the rate of body evaporation, then it must be controllable. A wonderful breeze in the summer is a detestable draft when the temperature drops.

The right design of air supply grille is all-important in this matter of air movement. Just as desk fans and mancooler fans are frequently adjusted, so must grilles be adjusted (Fig. 3). The answer lies in providing directional control that is adequate and yet convenient at every air outlet. Swivel-type nozzles, ceiling diffusers and grille arrangements are all used as will be shown in THE 1957 GUIDE. Proper operation requires that the workmen can adjust from the working floor by chain, pull rod or *window stick*. At least 2 man-

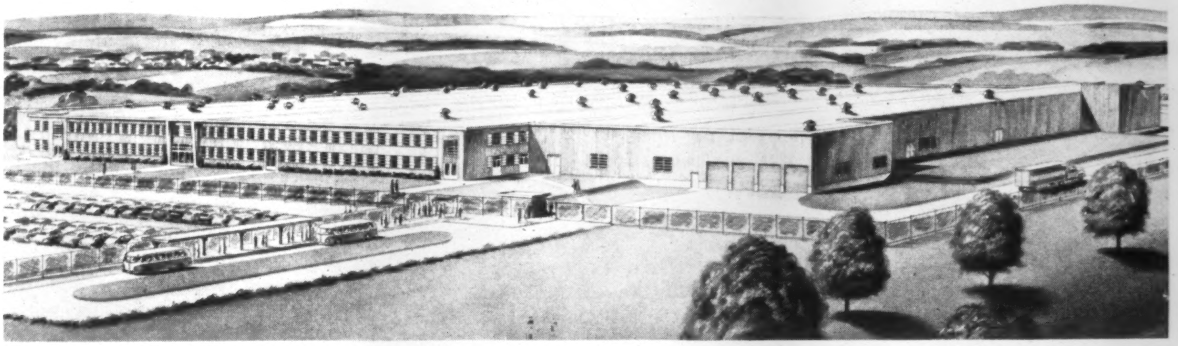

Fig. 4—Light manufacturing plant (Class A) Lancaster, Pa., one-story building, with 21-ft roof height and virtually no windows. All-year mechanical ventilation gives summer comfort despite low roof

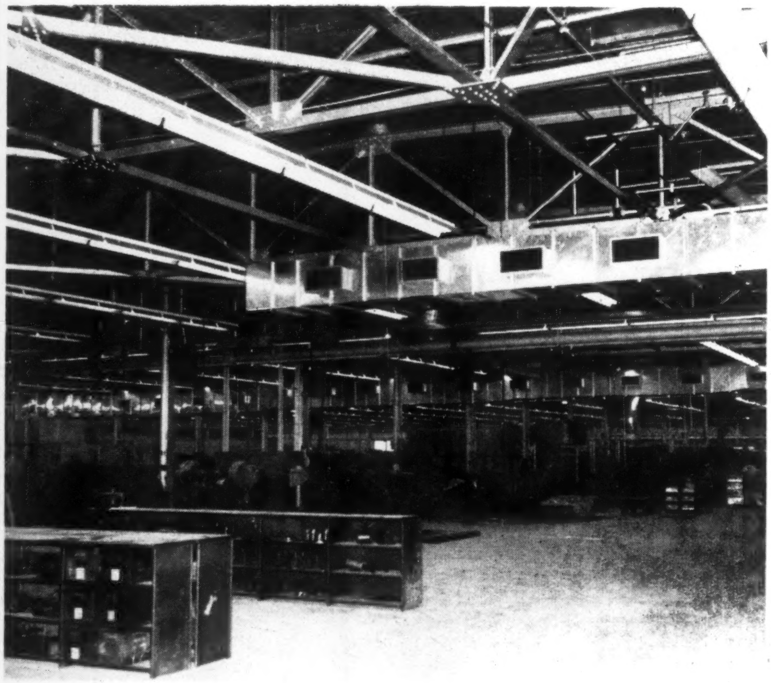

Fig. 6—The 1 long duct shown in Fig. 5 produces discernible air motion in summer at distances of 80 ft and has grilles with large adjustable vanes

ufacturers offer grilles with a set of vanes with chain-pull operation and spring return and the cost is only about one cent per cfm.

By adjusting the front horizontal vanes, the air stream can be directed downward in various degrees toward the operating floor as temperatures dictate or directed upward when objectionable. This feature is most essential during winter make-up operation permitting maximum air capacity to be maintained. Without fear of contradiction, one can state that unless handy grille adjustment from the floor is provided on spot cooling installations, the system will assuredly fall into disuse as complaints multiply. Usually, grilles for Class A work are mounted overhead on the main trunk duct which may be at an elevation of 12 to 15 ft. Whereas, grilles for Class B spot cooling are located within 5 to 15 ft of the workmen's station and preferably no higher than a man's head.

One summer-winter ventilation study might be directed to an Aluminum Company of America plant at Lancaster, Pa., that is devoted to light manufacturing (Class A). This one-story building (Fig. 4) was completed in 1954. About 400 ft wide x 500 ft long with only 21-ft roof height, it is built with virtually no windows and consequently, it has neither cross circulation nor natural ventilation. Considerable heat is released by some 1200 connected horsepower motors in 2 enclosed areas, plus several heat-treating furnaces. Despite the absence of air conditioning, it is a rather pleasant place to work.

Automatic screw machines and rivet-heading machines call for oil-mist exhaust of about 100,000 cfm; hence, make-up air for winter is heated and distributed by 2 of the 3 central systems of 65,000 cfm each (Fig. 5).

One long duct (Fig. 6), having 3000 cfm grilles with 1800 fpm velometer velocity, covers an 80 ft width on each side or a 160 ft zone across the building. In this area, it produces discernible air motion in summer. Grilles have large vanes operated as a gang and adjusted by a *school room* window stick. These large ducts 66 in x 48 in were designed long after the building steel was ordered, but in aluminum construction, their light weight of 24 lb per linear foot was no load carrying problem.

But winter make-up air volumes were not enough for summer cooling. Winter air supply in the machine area amounted to 3 cfm per square foot of floor area and this was increased to 6 cfm to remain within 5 deg rise.

Though beyond the subject of this paper, the most foolproof and sim-

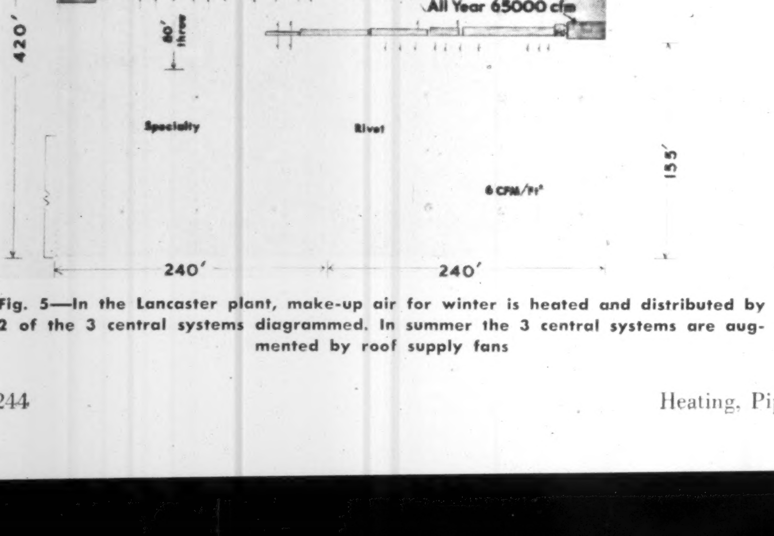

Fig. 5—In the Lancaster plant, make-up air for winter is heated and distributed by 2 of the 3 central systems diagrammed. In summer the 3 central systems are augmented by roof supply fans

ple source of additional volumes of summer fresh air at Lancaster were roof intake fans or supply ventilators (Fig. 7). This so-called mushroom or low-type ventilator is in essence an axial flow duct fan tied down to the roof opening curb and covered with an adequate rain umbrella. Roof supply ventilators were located at strategic spots, each discharging through a downcoming duct and an 18,000 cfm ceiling diffuser of the heating duty type. These aluminum roof intake ventilators are almost identical with roof exhaust ventilators (Fig. 8).

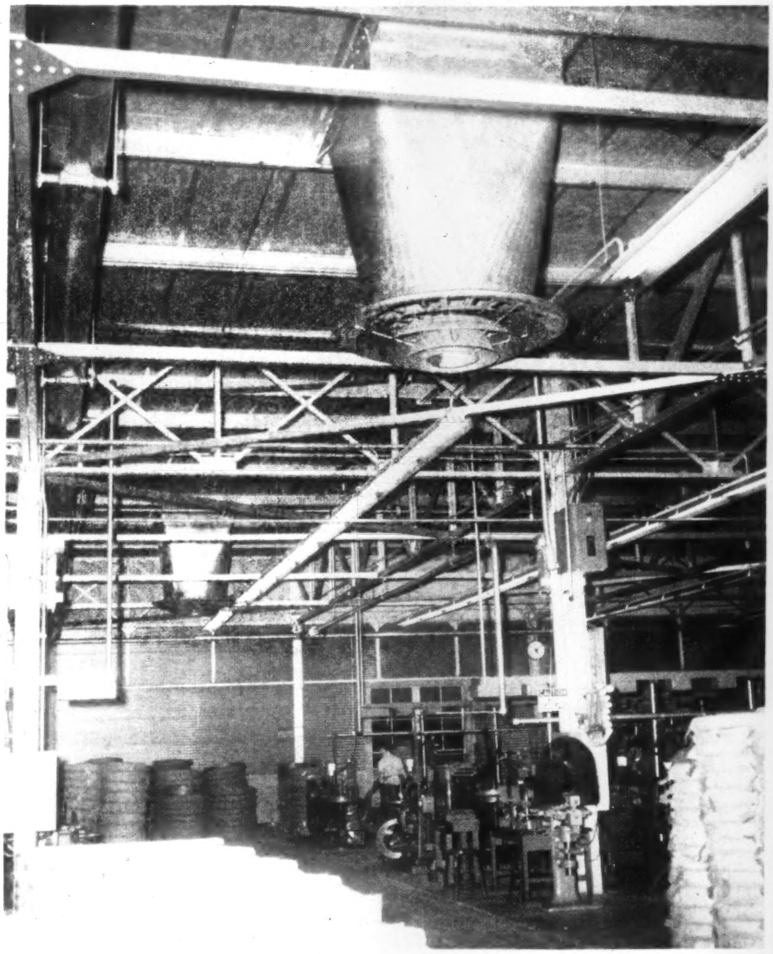

Fig. 7—Low-type roof ventilators strategically located supply additional summer outdoor air at Lancaster plant avoiding stratified heat while diffusers prevent air blast

Another make-up air system (Class A) of totally different design for similar light manufacturing is found in the 1956 Ekco-Alcoa Container Plant in Wheeling, Ill. This 550-ft x 300-ft windowless building has a 30-ft roof height. The press area has some 400 connected motor horsepower with a combined 60 percent load and usage factor. In this plant, the winter-summer air supply and comfort ventilation depends on eleven 20,000 cfm blower-type unit heaters. This building must be clean and sanitary as a new bakery; hence, no outside openings to admit airborne dirt and insects.

At Wheeling, the air movement of 50 fpm to 100 fpm at the man is obtained by the novel means of a slowly rotating, 2-nozzle air delivery head at each unit heater (Fig. 9). The 2800 fpm nozzle velocity is dispersed effectively and economically over an approximately 100 ft circle. Designed for 5 deg temperature rise and 3.3 cfm per sq ft in production areas, it was cool in the manufacturing area last summer; the plant, however, was not in full operation. The entire building receives 220,000 cfm of fresh air in summer and 80,000 cfm in winter.

Table 1 - Typical Total Installation Costs

	Cost/cfm	Cost per sq ft floor area
Lancaster		
Roof Supply Ventilators	$0.09	
Central Stations & Ducts	$0.34	0.52 and 0.70
Overall Heating & Ventilating & Steam Piping, but no boilers		$1.10
General		
Estimated Blower-Type Unit Heater with 50 ft long duct	$0.25	

Ventilation people see in these 3 types of summer comfort ventilation, the confirmation of an important law. There are tremendous air motion gains when air is blown into a working area as compared to air motion produced by an exhaust.

In other words, air that is pushed will provide many times more circulation than air that is pulled. By way of explanation, first it is known that a given velocity can be obtained 30 times further away from a nozzle opening by blowing than by exhausting. Second, the induced air motion set up by a 2000 fpm straight-throw air stream driving across a room approximately quadruples the total room circulation.

As to comfort requirements, very little published data exists on allowable temperature rise values for air change in summer, but Table 2 shows typical values that have served adequately as a rule of thumb.

Table 2 - Allowable Temperature Rise Values[a]
(For setting up summer supply volumes)

Roof Elevation	F Deg Rise
40-ft	12 to 20
30-ft	8 to 12
20-ft	5 to 8

[a] Conditions are limited to: (*a*) Supply air outlets not more than 10 or 15 ft above floor; (*b*) Light or medium heavy manufacturing operations; (*c*) Freedom from radiant heat; (*d*) Temperature rise = roof exit temperature − outdoor temperature.

Because these values refer mainly to roof exit temperature rises and serve to set up air supply and exhaust volumes, they are not truly indicative of floor temperatures. For this reason, 3 deg is recommended as the maximum allowable temperature rise for an air stream as it leaves the grille and reaches the man. This holds for both Class A and Class B work.

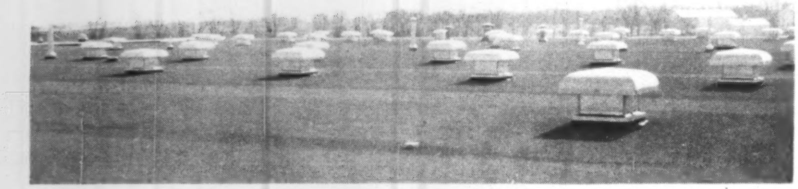

Fig. 8—Intake ventilators resemble exhaust ventilators

Before closing, perhaps a comment is in order about the fact that questions will be raised, many on the negative side. Admittedly, this field of low cost comfort ventilation is not conventionalized like unit heater layouts and dust collecting systems. Any field experiences and designs will be greatly welcomed by the Society Temperature Extremes Sub-Committee.*

Sooner or later, many members of this Society will be called upon to provide more drastic heat relief than so-called Class B condition requires; hot furnaces, hot metal and hot equipment with radiant heat as the predominant factor. If there could be some way to provide air at 80 or 85 F close to the man, then the workman becomes cooled. This is accomplished to an appreciable extent by convection and not entirely by sweating. Actually, when outdoor air ventilation is inadequate and reflective heat shields do not adequately reduce the radiant heat stress[5] on a man, there is a final relief measure available known as evaporative cooling. Time prevents any discussion of this neglected technique for obtaining drastic industrial heat relief.

Nevertheless, it is mentioned here for 2 reasons: first, because central evaporative cooling systems are ideally suited to make-up air service — usually by merely adding heating coils, controls and adjustable grilles. Second, because make-up air, spot cooling and evaporative cooling are combined in a few slides that will be shown.[4] Perhaps these sketches and photographs will be of assistance to someone.

In conclusion, perhaps it would be profitable to repeat a suggestion made in an earlier paper: the starting point should be based on small installations in different plants in order to set up standard values because industrial ventilation is still in a development stage. There is still the lack of a good yardstick to predict whether an installation will be a success. What satisfies one plant superintendent, may not satisfy another.

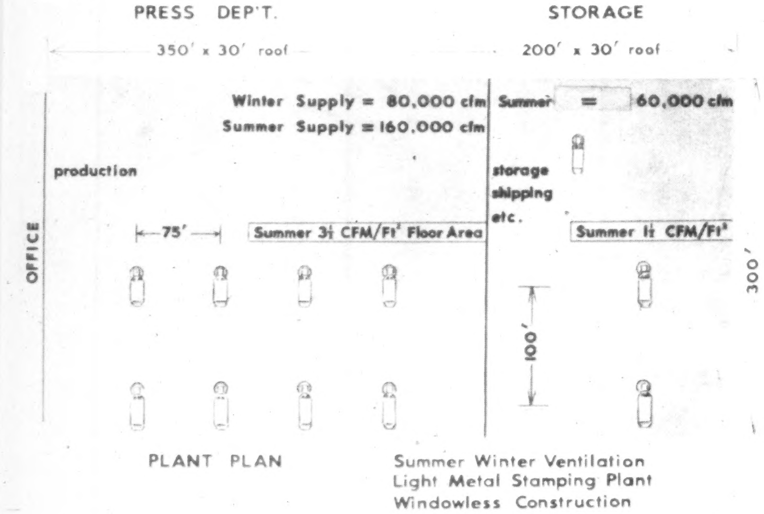

Fig. 9—Floor plan of Wheeling, Ill. plant showing locations and capacities of units supplying make-up air and having slowly rotating, two-nozzle air delivery head at each unit heater

Finally, let us hope that much good will come from our endeavors as we apply our engineering abilities to one of the great humanitarian needs: the development of a better place for our fellow man to spend his working hours.

Acknowledgment

The author wishes to acknowledge the cooperation of the American Blower Corp. for furnishing the photograph of Fig. 2.

References

1. HEATING VENTILATING AIR CONDITIONING GUIDE, 1956, Chapter 6, Fig. 9, p. 125, Effective Temperature Chart (published by the AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS, New York, N. Y.).

2. Protecting the Worker in Hot Environments, by Dr. Lucien A. Brouha (Industrial Hygiene Foundation, Pittsburgh, Pa.).

3. Sam Lewis' Page, of Smells and Smelling, by Samuel R. Lewis (*Heating, Piping & Air Conditioning*, April 1954, p. 101).

4. Heat Relief in Industry, by B. R. Small (*Iron and Steel Engineer Magazine*, April 1952) (*Heating, Piping & Air Conditioning*, November 1952, p. 100).

5. Index for Evaluating Heat Stress in Terms of Resulting Physiological Strains, by H. S. Belding and T. F. Hatch (ASHAE TRANSACTIONS, Vol. 62, 1956, p. 213).

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*Personnel: J. H. Clarke, Chairman; A. D. Brandt, F. N. Calhoon, T. F. Hatch, B. R. Small.

Dust Particle Inertia and Various Consequences

By W. C. L. Hemeon*, Pittsburgh, Pa.

Description of particle size distribution in micron units is a convenient language for characterizing the fineness of dust and powders, but in no case is particle size itself a property of ultimate interest. In all fields where fine particle technology is important (such as Portland cement; paint pigments, soil mechanics, metal powder sinter, catalysts and dust collection) it is always some other property, sometimes only partially related to the fineness, that is of dominant interest (e.g., chemical reaction rate, pigment hiding power, catalytic activity, settling velocity).

In industrial dust control interest lies in a variety of situations in which fine dust particles are suspended in air or gas. These include the human health aspects of dust inhalation in which it is important to know the extent to which inhaled dust particles penetrate the lung; the engineering of certain types of dust exhaust systems; the performance of dust collectors applied to gas cleaning, or the effectiveness of filters for supply air cleaning.

In these various processes particle size measurements are of interest, but in all these applications it is actually the inertia of the particle which determines its behavior and from an engineering standpoint, therefore, it is highly profitable to acquire a quantitative understanding of the fundamentals and of their practical application.

In the context of this discussion, the term particle inertia refers to the reaction of forces between a suspended moving particle and the air or gas in which it is suspended. The motion of the particle is retarded by the viscous resistance or the turbulence drag of the gas and in this interaction there are 3 relationships of particular interest to us. One is the effect on particle velocity *vs.* distance of travel; another is the rate of change of direction of a particle as the transporting gas stream approaches and is diverted by a target, *e.g.*, a fiber element of a dust filter; and finally the magnitude of the energy required to retard the velocity of particles in motion. As to the latter, it will be noted that the resistance to particle motion is a force that is applied to a particular velocity, and the product of force and velocity is power. A practical application of this phenomenon will be seen later in this discussion.

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SUMMARY — Why determinations of dust particle distribution are important. Calculation of the magnitude of particle inertia. Includes among the consequences of particle inertia those related to dust control; to flue gas measurements; to particle size determination; and to dust collector performance.

Magnitude of Inertia

One can readily visualize the magnitude of particle inertia in relation to the drag of gas in which it is suspended by reference to the following illustration. The terminal velocity of spherical particles of specific gravity, 3, in air at normal temperature, is given by:

$$U_t = 2.77 \times 10^{-4} d_m^2 \quad \ldots\ldots\ldots\ldots\ldots (1)$$

where

d_m = particle diameter in microns and U_t is in feet per second.

According to this equation which is a form of Stokes law, a 1-micron particle would have a settling velocity of 0.0033 in. per second and a 40-μ particle would settle at a velocity of over 5 in. per second. If each were to be subjected by centrifugal action to a force 100 times gravity, the velocities would be 0.33 and 530 in. per second, respectively.

The rapid decrease in mobility of fine particles below 5 to 10 μ, independently of the suspending gas, can also be illustrated by calculation of the rate of velocity decay for particles projected bullet-like with initial high velocity, as shown later.

Limitations of Dust Exhaust Hoods

One interesting series of consequences of these inertial properties of dust may be considered in connection with the design and function of an exterior hood, *i.e.*, a hood in which the physical boundaries of the exhaust hood itself do not enclose the dust source, or, conversely, one in which the dust generating zone is entirely exterior to the opening of the hood. The function of the exhaust hood in this case is to create an enclosing envelope of air currents of a velocity adequate to direct the dust into the hood opening.

A consideration of the inertial tendencies of dust particles as defined by the rate of velocity decay in a particle to which an initial high velocity is imparted makes it clear that particles above some size cannot be drawn into the hood by the air currents within the envelope as shown in the following:

In Fig. 1 for example, assume that a violent dusty process imparts an initial velocity of 1000 fpm to all particles. The rate of decay of velocity can be calculated by the means of Equation 2, and compared with the dimensions of the protective air velocity envelope.

$$S = 19 \times 10^{-3} Z d_m \log_{10} U_o/U \quad \ldots (2)$$

where

S = distance in feet corresponding to decay in velocity from initial U_o to final U, in feet per second,
Z = specific gravity,
d_m = particle size in microns.

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Journal Section

Comparison of the behavior of a 25-μ particle and one 2-½ microns (sp gr 2.7) according to Equation 2 shows that the velocity of the smaller particle will have decreased to 250 fpm within a distance of only 1 in. whereas the larger particle will travel 10 in. before slowing down to the same velocity.

This calculation demonstrates the difference in escape tendencies of large and small particles. In the case of dusty processes in which fine clouds of visible dust comprise the entire problem, an exterior hood can function effectively regardless of the escape of small amounts of large particles. If, however, the dispersion of larger particles to the surrounding area be a nuisance of equal or greater importance, then this type of hood may be inadequate to the task unless ways can be found to erect baffles to intercept their bullet-like motion and auxiliary means for collection and removal, assuming of course that this particular process will not permit the placement of the hood so that the larger grains are projected directly into its throat.

Energy in Falling Particles and Equivalent Air Flow

A particle falling through air is subject to a drag force tending to retard its motion. The reaction of this force on the air is to set elements of the air in motion, a phenomenon which is of considerable importance in the design of some dust control systems especially in the conveying of bulk materials (ores, crushed rock, and the like). Where, for example, a stream of such material drops from an elevation into a bin, it induces a flow of air in the same direction. The rate of exhaust from the enclosure to prevent the escape of dust is in this case determined by the rate of flow of air induced by the falling material. It is, therefore, desirable to have a method for estimating this air flow rate.

A logical basis for considering the question has been outlined elsewhere by the writer[1]. It consists in the development of equations for the calculation of the power in a stream of falling particles, and then of a relationship for applying this power figure to an estimate of equivalent air flow. The relationship employed for the latter is based on the well-known air-horsepower formula commonly applied in the selection of fans for particular exhaust system duty which in conventional units of ventilation design is:

$$\text{Horsepower } (HP) = (\text{cfm})\ (\text{pressure, inches water})/6360 \quad \ldots\ldots\ldots\ldots\ldots (3)$$

Knowing horsepower and pressure, the air-flow rate, cubic feet per minute, can be calculated. What is the nature of *pressure* in the present context? On the basis of one simplifying assumption, *i.e.*, that all the power of the falling particles is devoted to the acceleration of air from a state of rest to some velocity (determined by cfm and stream area) it has been shown[1] that the maximum theoretical air flow in cfm induced by a stream of falling particles of stream area, A, in square feet, is given by

$$q = 4650\ (HP)^{1/3} A^{2/3} \quad \ldots\ldots\ldots\ldots (4)$$

Limitations

The simplifying assumption is not correct since as everyone knows the air motion in the wake of any moving object is not laminar as assumed in this development, but highly turbulent and therefore some of the energy is absorbed in the vortices created. It is, however, useful to know what the maximum air flow may be and the calculation provides a basis for conservative estimates and for rationalizing empirically observed data.

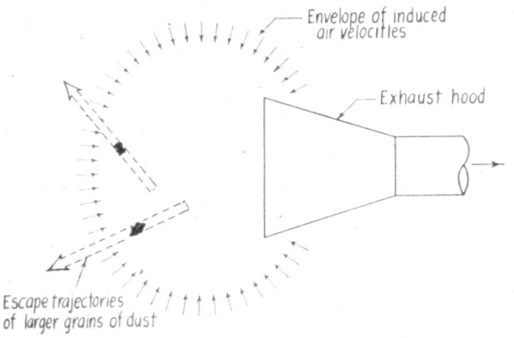
Envelope of induced air velocities
Exhaust hood
Escape trajectories of larger grains of dust

Fig. 1. Illustrating the escape tendencies of large dust particles to which initial velocity has been imparted, from the protective envelope of an exhaust hood

Calculation of power developed by a stream of falling material for use in Equation 4 is performed according to various relationships that fit different conditions with respect to factors such as particle size and falling distance. The simplest one pertains to the situation in which the particles have previously attained their falling velocity:

$$HP = Rs/550 \quad \ldots\ (5)$$

where

R = the weight rate of particle flux, lb per second.

s = the falling distance, in feet.

As an interesting exercise in the application of these equations calculate the falling power in a column of natural rain when the rainfall rate is 1-in. per hr (R = 5.2 lb per hr per sq ft) and the height of fall s is 3000 ft. Substitution in Equation 5 leads to a figure of 28.3 HP per sq ft which is more than one million horsepower per acre.

Were this a problem in dust control for a bulk materials handling system it would be found useful to take the next step and calculate the air flow equivalent of the energy and thus be assisted in arriving at a value for rate of exhaust from the dusty enclosure.

Measurement of Dust Loading in Gas Streams

The isokinetic sampling principle in the measurement of dust weight flowing in a duct or stack is well known. The importance of aspirating gas into a sampling tube at the same velocity as prevails in the gas stream derives from the inertial properties of dust particles, especially those larger than around 20 microns.

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[1] Exponent numerals refer to References.

The widely recognized code of the *American Society of Mechanical Engineers*[2] discusses test procedures in detail and anyone with a little experience and ordinary care can make a good determination of the concentration of dust flowing at *the point of sampling*.

Total Dust Measurement

The real difficulty is in determining total flux of solids throughout an entire cross section, because of the intense stratification of dust commonly occurring except in those few instances where the solids are very finely divided and there are no coarse particles. It is customary to traverse the cross sectional areas of the flue from location to location in a sequential manner, hoping to obtain an average sample, but those experienced in this field generally recognize the shortcomings of this procedure, especially where the process is known to discharge solids at rates that vary from minute to minute. Multiple sampling nozzles in large numbers operating simultaneously at various points of the cross section tend to overcome the difficulty, but this enormously complicates the test procedure. Preoccupation with the procedural details necessary for accuracy at any one location has tended, it seems to the author, to obscure the importance of procedures for establishing accurately the total average flux of solids through the entire cross section. This need becomes particularly important as the cross section increases, where a straight run of duct several diameters downstream from a bend is not available and where access is available only to a horizontal section.

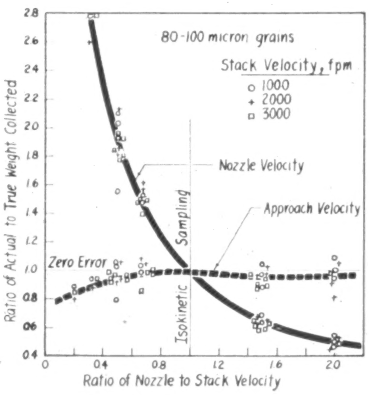

Fig. 2. Two different methods for plotting the same data indicating sampling error due to departure from isokinetic velocities. Where particle size is large, approach velocity minimizes error

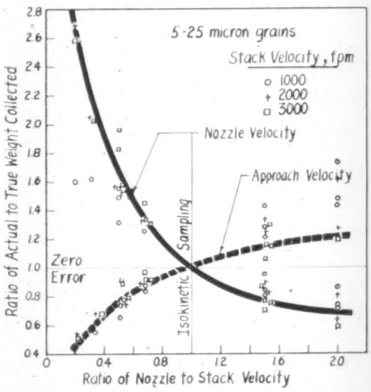

Fig. 3. Same subject as Fig. 2 except that data apply to smaller particle size. The approach velocity basis for fixing gas sample volume is shown to have merit equal to that based on nozzle velocity

Experimental Studies

The author and associates addressed themselves to the fundamentals of stack dust measurement[3] a few years ago and were soon confronted with some dramatic and intriguing results. In plotting the results of some dynamic sampling tests to show the percentage sampling error in relation to deliberate departures from isokinetic nozzle velocities, it was discovered what in hindsight is rather obvious, namely, that if the volume of gas sampled is defined in terms of the velocity of approach to the nozzle (instead of actual velocity in the nozzle), the percentage error in the case of large particles is greatly reduced. Furthermore the larger the particle or the higher the approach velocity (*i.e.*, the greater the particle inertia), the more the sampling error approached zero. This is illustrated in Fig. 2 for particles in the 80-100 micron size range.

In the case of small particles, in the tests defined by grains in the 5 to 25-micron size range, there is little difference in the indicated error regardless of which plotting method is employed (Fig. 3).

This led to the conclusion that it is more logical to define volume of gas sampled in terms of approach velocity than of actual nozzle velocity, and interpretation of data on this basis leads to other useful sampling concepts. This definition of gas volume sampled can be visualized in terms of an imaginary frictionless tube disposed coaxially upstream from the actual sampling nozzle. Where isokinetic sampling velocities prevail, the two gas volumes are identical. It is in consideration of the consequences of deliberate or unavoidable departure from this ideal sampling condition that its value appears.

If this idea went no further, it would at least point up the absurdity of current common methods of gas measurement in which an integrating gas meter is relied on for data on total volume of gas sampled which can imply, at least to the novice, that so long as the total gas volume data are obtained, only slight disadvantage results from departure from isokinetic velocities during the actual sampling period. It will be obvious from this discussion that an indicating flow meter, the antithesis of an integrating meter, is the logical device for these purposes.

The Manifold Sampler

The most interesting result of practical importance derived from these conceptions was in the development of data to show the application of a nozzle-manifold system[4] for sweeping the total cross section of a large flue. These experiments were concerned specifically with an estimate of overall sampling accuracy when some departure from isokinetic velocity is permitted for some of the manifold nozzles in exchange for the advantage due to the creation of an infinite number of individual sampling locations. The manifold concept was shown to have great sampling advantage even in cases where individual departures from isokinetic conditions were necessarily appreciable.

The basic idea does not amount to advocating abandonment of the isokinetic principle of sampling; its validity has been established in studies by the author as well as in those of many others. It constitutes, rather, a description of the extent to which some departure from the rigid procedural rule can provide a superior result for the ultimate objective in any test program, namely, the measurement of *total* dust flux, not simply that at one point.

Measurement of Particle Size in Relation to Dust Collector Performance

Where a discrepancy is consistently noted between the measured particle size and the property of interest, the validity of the measurement method may be questioned. Such discrepancies have been particularly prominent in studies of dust collector and air cleaner performance in which the dominant property of interest is their collectibility in equipment where inertial forces are operative. In this application, also, therefore, it is the inertial property of the dust that is important and if the measured size distribution does not correspond to the performance of a collector and this is common experience, it is simply an indication that the size distribution in terms of the method employed is an unsuitable index of the primary property of interest.

Among the methods used for particle size measurement in dust collection technology the commonest are: laboratory elutriation in air which involves re-dispersion of a dust sample collected from a gas stream into a laboratory air stream for passage through an elutriator; microscopic sizing, involving re-dispersion of a collected dust sample in a liquid for counting under the microscope particles of various apparent diameters; and liquid sedimentation methods, involving redispersion of a collected dust sample in a liquid for measurement of its rate of sedimentation therefrom.

Particle Aggregation

Various types of aggregation are represented in idealized form in Fig. 4 which also indicates what transformation in the original aggregate is likely to occur by the very process of preparing the sample for size analysis. Section (*a*) represents a loose aggregate enclosing relatively large volumes of gas with a quite different density value, *z*, and effective diameter, d_m, after it has been subjected to the deflocculating action of the fluid used in preparing it for either microscopic sizing or liquid elutriation.

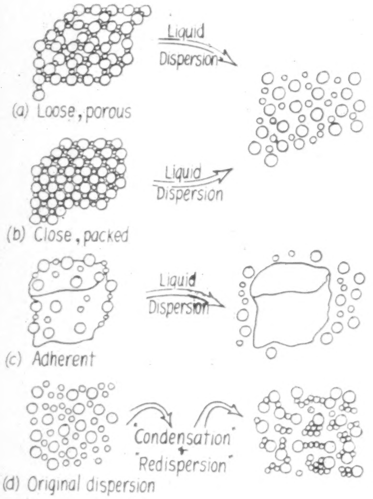

Fig. 4. (a), (b) and (c): Various forms of particle aggregation indicated at the left, and, at right, the break-up of aggregates due to dispersion in liquid during preparation for size analysis. (d) Represents the air elutriator sizing method in which particles originally well dispersed are imperfectly re-dispersed

In section (*b*) of Fig. 4 a close-packed aggregate is depicted which undergoes drastic modification of its effective diameter after it has been prepared by liquid dispersion for the size measurement procedure. Section (*c*) illustrates a third form in which small particles adhere to the surface of large ones but which are detached by the dispersing action of the fluid in preparing it for size examination.

A fourth situation (*d*) pertains to the size analysis by air elutriation in the laboratory. This involves collection of the sample from the original gas (air) suspension, transport to the laboratory and redispersion into a stream of air carrying it through a gravity elutriator. The figure illustrates the case where the laboratory elutriator fails to break up the aggregates formed by the condensation process which is the essence of the initial sampling.

These line-drawing illustrations are obviously a considerable over-simplification of the nature of particle aggregation. There must actually be combinations of various types of aggregation in actual practice. In some instances, the result of a particle size analysis will correspond to its inertial properties as defined by its behavior in a dust collector or air filter. It is safe to say, however, that for the most part this would be coincidence except where the particle mixture is completely dominated by weight of large particles, since aggregation is of little significance where the particles are all large. This is illustrated by the lack of coherence in dry grains of sand in contrast with that noted in a mass of fine powder.

There can be little question that the prevalent confusion in the rating of dust collector performance is due largely to failure of particle size measurements properly to indicate the inertial characteristics of a dust mixture mainly for the reasons indicated in the preceding discussion.

The frequent and casual use of the term particle size in connection with various kinds of dust control problems usually appears to imply that such data constitute a complete and adequate definition of the pertinent dust qualities. The few illustrations presented here are an attempt to demonstrate how erroneous this concept may be. The inertia of gas-borne dust particles is all important and in most cases, furthermore, this dimension is not adequately represented by the usual methods of particle size measurement.

References

1. Plant and Process Ventilation, by W. C. L. Hemeon (*The Industrial Press*, New York City, 1955, pp. 120-141).

2. Test Code for Dust Separating Apparatus (*American Society of Mechanical Engineers*, Test Code 21, 1941).

3. The Magnitude of Errors in Stack Dust Sampling, by W. C. L. Hemeon and G. F. Haines, Jr. (*Journal of the Air Pollution Control Association* (Air Repair), Vol. 4, No. 3, Nov. 1954, pp. 159-164).

4. A New Method for Stack Dust Sampling, by G. F. Haines, Jr. and W. C. L. Hemeon (Ibid., pp. 165-169).

Acoustic Coupling of Residential Furnaces with Their Surroundings

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This paper is the result of research sponsored jointly by the American Society of Heating and Air-Conditioning Engineers, the *American Gas Association* and the *Oil-Heat Institute of America, Inc.*, conducted through Battelle Memorial Institute.

SUMMARY—A short theoretical and experimental investigation was made to study the conditions under which an acoustic coupling could take place between an oil- or gas-fired central heating unit, and the room in which it is placed. A room was tested to determine its acoustical characteristics. When an oil furnace-burner unit, whose oscillating frequency was close to the resonant frequency of the room, was placed in the room, it was found that an acoustic coupling took place and a standing wave was set up. Large differences in the apparent noise level of the furnace could be noted by changing the position of the furnace.

An equation and some plots are given to help installation engineers determine whether a furnace will couple with a given room. If coupling does take place, methods are outlined which will help in locating a furnace in a position that will give a low noise level.

Pulsations have been one of the most annoying problems facing the manufacturer and the installer of combustion equipment for heating. A furnace or boiler that *goes into pulsation* may be noisy enough to be heard or felt throughout the dwelling, and sometimes may even cause damage to the building or its contents. Service calls to correct the condition can represent a considerable expense to the organization responsible for the satisfactory performance of the equipment. Therefore, a research project was activated at Battelle in May 1954, to (1) determine the nature of pulsations in oil- and gas-fired residential furnaces and boilers, and (2) find methods for suppressing pulsations. This work has been made possible by the cooperative efforts of the American Society of Heating and Air-Conditioning Engineers, the *American Gas Association*, and the *Oil-Heat Institute of America, Inc.*; support within the latter organization has come both from the equipment manufacturers and from oil refiners. The project is guided by the Pulsations Research Steering Committee of the Technical Advisory Committee on Combustion of the ASHAE.

The purpose of this paper is to show that the room in which the heating unit is located can play, on occasion, an important role in the overall room noise level produced by the combustion process in the heating unit. Although this paper deals specifically with residential gas- and oil-fired furnace-burner units, it should be emphasized that the methods outlined here are equally applicable to boilers and other heating units. The important criterion in determining if a unit will be troublesome is not its size, but instead, its frequency of oscillation relative to the natural or resonant frequencies of the enclosure in which it is installed.

It should also be stated that the noise levels referred to in the text are those at different points in the room which result from the combustion noise originating within the combustion chamber of the burner units. The term *coupling* used in the title and text normally might imply that the noise from the combustion chamber affects the noise level in the surrounding room, and that the reverse is also true. However, in this study, the reverse effect appears to be quite small. For as outlined in an earlier paper,[1] the mechanisms that generate the oscillations in gas- and oil-fired furnace-burner units are involved with quite local conditions within the furnace proper. Changes in the pressure within the furnace resulting from the oscillations in the surrounding room are felt to have only a slight effect on those local conditions which cause furnace oscillation. Thus, the term *coupling* in this paper should be thought of in a more restricted sense than usual.

Preliminary Considerations

A series of field tests was made to determine if there was a correlation between the oscillating frequency of different residential furnaces and the distance between the entrance of the air into the furnace and the barometric damper for oil furnaces or the draft hood for single-port-type gas furnaces.

Fig. 2 shows a log-log plot of the results of these field tests. It should be noted that these oscillating frequencies were fixed by design and were not varied during a particular test. The method of approximating the distance of gas travel inside the furnace is outlined in Fig. 7 of the earlier paper.[1] On Fig. 2, straight lines at an angle of 45 deg are drawn through each set of data.

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For presentation at the Semi-Annual Meeting of the American Society of Heating and Air-Conditioning Engineers, Murray Bay, Que., Canada, June 1957.

[1] Pulsations in Residential Heating Equipment—Preliminary Results, by A. A. Putnam and W. R. Dennis (ASHAE Journal Section, *Heating, Piping & Air Conditioning*, July 1956, p. 131).

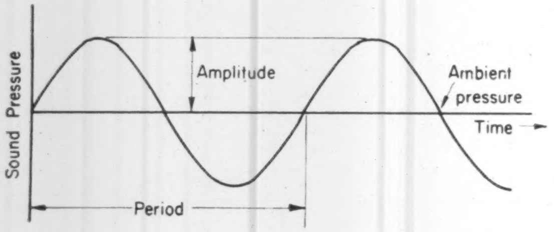


Fig. 1 — Sinusoidal variation of pressure with time

If all the furnaces tested had been identical except for size, then theoretically the points would have fallen on such 45 deg straight lines as shown on Fig 2. It is evident from the scatter of the data that the furnaces were not identical. Nevertheless, by using these straight lines, a first approximation can be obtained for the value of the frequency of oscillation for a particular furnace. It should be noted that all the furnaces listed had frequencies of oscillation below 80 cps.

Any room or large enclosure will have several resonant frequencies and these frequencies will be a function of the dimensions of the room. Generally speaking, rooms usually encountered in residential installations will have at least one resonant frequency between 10 and 100 cps. If a furnace which oscillates at a certain frequency is put in a room whose resonant frequency is close to the oscillating frequency of the furnace, then there may be a general increase in the noise level produced by the furnace. Essentially, the room amplifies the noise of the furnace; in the technical sense there is an *acoustical coupling* between the furnace and the room. A standing wave is set up and in certain parts of the room the noise level will seem higher than normal.

Experimental Results

Fig. 3 is a plan view of the room chosen for the series of tests designed to show that acoustic coupling can occur between a furnace and a room. The room was 24 ft 7 in. long, 11 ft 6 in. wide, and had a height of 10 ft 10 in. to the bottom of the ceiling joists. Although there was a jog in wall A, it will be shown later that this had no appreciable effect on the results of the tests.

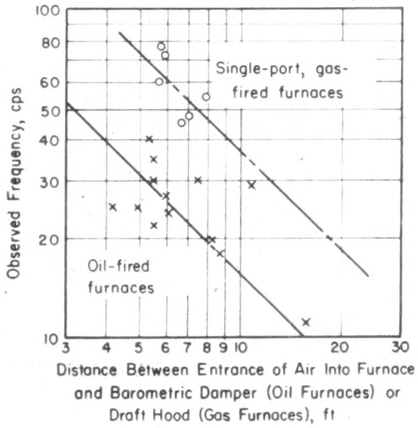


Fig. 2 — Frequency of oscillation as a function of furnace size

In the first series of tests, a loudspeaker, mounted in a cabinet, was used as the sound source. The speaker was driven by an audio oscillator. The "X" marked on the centerline of the room, as shown in Fig. 3, indicates the position of the condenser microphone used in these tests. The signal from the microphone was fed into a chart recorder which recorded both the magnitude and frequency of the signal.

The first test conducted was to determine the frequency response of the room and, in particular, the resonant frequency of the room. This was done by placing the loudspeaker-cabinet combination on the centerline of the room near wall B. The frequency of the sound was varied and the amplitude of the sound level recorded for each frequency.

Fig. 4 shows the results of these tests. The resonant frequency occurred at a frequency of 26.5 cps. In order to assure that this resonant point was due to the room and not the loudspeaker-cabinet combination, a test was conducted on the loudspeaker-cabinet combination alone in a large room. The results of this second test are shown in the inset in Fig. 4. As can be seen, there was no resonant frequency of the loudspeaker-cabinet combination between 19.5 and 31.5 cps. Therefore, it can be concluded that the resonant frequency of the room was 26.5 cps.

In the second series of tests, the microphone was kept in a fixed position, but the speaker-cabinet combination was moved along the centerline in such a way as to be always parallel to the original position. A constant signal, whose frequency was 26 cps, was fed into the loudspeaker.

Fig. 5 shows the average amplitude of the sound at the microphone as a function of speaker position. As can be seen, a standing wave was set up in the room. There appears to be a pressure antinode at or near wall B.

Fig. 6*a* shows the results of a test in which a residential oil-fired furnace, whose oscillating frequency was about 25 cps. was substituted for the loudspeaker-cabinet combination. This particular oil furnace was used because it had an oscillating frequency close to the resonant frequency of the available room. This oscillating frequency was kept constant during the test by maintaining the furnace controls, the distance from the furnace to the barometric damper, and the overall stack length constant. It can be seen that a curve similar to that of Fig. 5 was obtained.

Fig. 6*b* indicates that the average amplitude of oscillation in the combustion chamber of the furnace did vary somewhat during the test. Correcting the curve in Fig. 6*a* for the changes in combustion chamber noise would have the effect of altering the position of the curve, but would not greatly change the shape of the curve. As a result, the change that did occur in the amplitude of the combustion chamber noise can be neglected.

Fig. 6*a* also shows the ability of a room to amplify the noise of a furnace. When the furnace was located near the center of the room, the noise level at the microphone position was quite low. However, as the furnace was moved closer to wall B, the noise level at the microphone increased greatly. Because of the characteristics of a standing wave, the noise level at the microphone will usually be greater or less than the noise level at the furnace, depending on their relative positions with respect to each other. It should also be added that the vertical coordinates on Fig. 6*a* and Fig. 6*b* should not be compared since 2 different microphone systems and positions were used for these measurements.

If a residential gas furnace, of similar size, had been used instead of the oil furnace for this test, a standing wave could also have been set up. Research work has shown that single-port gas furnaces normally have oscillating frequencies which are twice that of oil furnaces. Since the product of the wavelength and frequency is a constant, doubling the frequency will halve the wavelength. Therefore, one complete cycle will appear in the case of the gas furnace as compared to one-half cycle for oil furnaces. It would therefore be expected that a pressure antinode would appear in the center of the room as well as at each end. For reasons discussed later, the locations for the gas furnace resulting in a minimum coupling with the room and therefore minimum noise output, would have been one-quarter of the room length from either end.

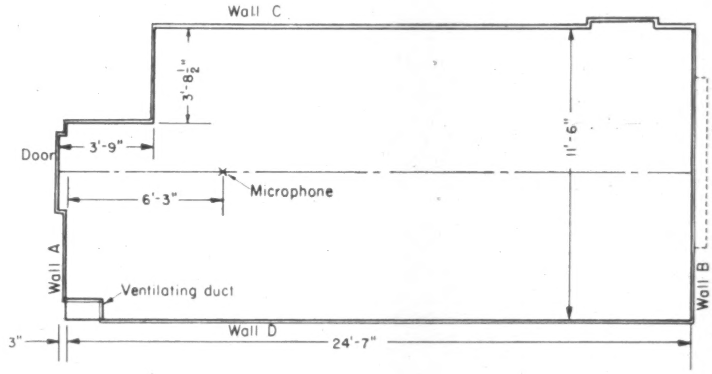


Fig. 3 — Floor plan of room used for resonance tests

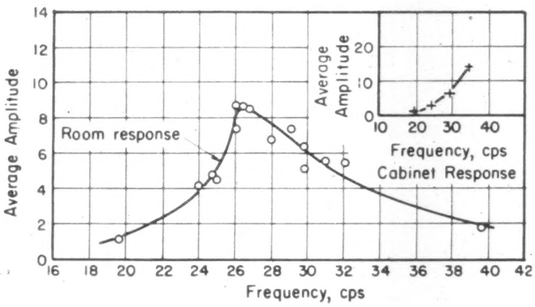


Fig. 4 — Frequency response of room

(Inset shows frequency response of speaker cabinet alone. Microphone at position marked in Fig. 3)

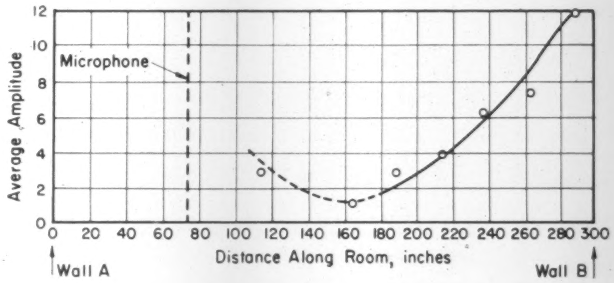


Fig. 5 — Effect of speaker cabinet position on amplitude

(Outlet of speaker cabinet facing Wall B. Microphone at position marked in Fig. 3)

Theoretical Considerations

The results of the test described show that coupling can take place between a furnace and a room and therefore indicate the desirability of preventing such coupling. Fig. 6*a* shows the importance of the proper furnace location. By positioning the furnace near the pressure node, coupling is prevented. When room dimensions can be changed, it is possible to make a judicious choice of room dimensions that will prevent coupling. In either case, it is important to know the frequencies of the modes of oscillation that can exist in a given room so that they can be compared with the frequency of oscillation of the furnace in question.

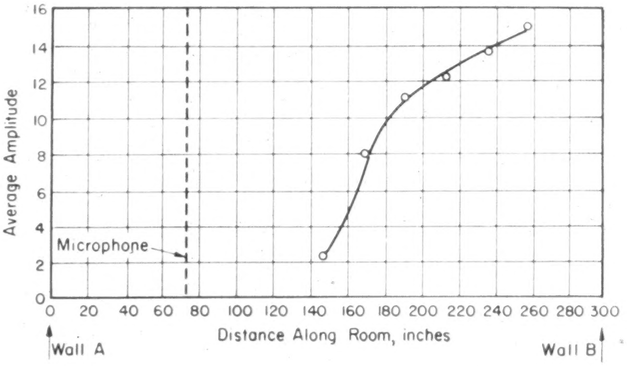


Fig. 6a — Effect of oil furnace position on amplitude

The basic equation used in this work is

$$f_n = \frac{c}{2}\sqrt{\left(\frac{n_l}{l}\right)^2 + \left(\frac{n_w}{w}\right)^2 + \left(\frac{n_h}{h}\right)^2} \quad (1)$$

where

f_n = resonant frequency.
c = velocity of sound (approximately 1120 ft/sec at 60 F).
l = length of room.
w = width of room.
h = height of room.
n_l = mode number associated with the length of room.
n_w = mode number associated with the width of the room.
n_h = mode number associated with the height of the room.

Equation 1 is used to determine the resonant frequency in terms of the 3 dimensions of a room and the mode numbers. A mode number can only have integral values greater than or equal to zero. For any particular natural frequency of the room, each dimension will have an individual mode number which will be equal to the number of evenly spaced lines of zero pressure amplitude (node) in that direction.

Figs. 7, 8, and 9 represent plots of this equation for one, two, and three dimensions, respectively. Fig. 7, for which n_w and n_h equal zero, indicates the resonant frequency as a function of mode number and one dimension. Fig. 8 indicates the resonant frequency as a function of 2 dimensions and the mode numbers $n_l = n_w = 1$, $n_h = 0$. In Fig. 9, the mode numbers are $n_l = n_w = n_h = 1$, and w is also fixed at a length of 20 ft. For all these plots, those areas which are pertinent to oil furnaces and gas furnaces are shaded.

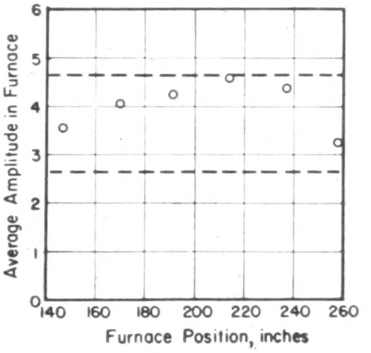


Fig. 6b — Amplitude in combustion chamber (probe measurement)

Figs. 10, 11, and 12 are examples of 3 different modes of oscillation that might be commonly found in rooms. The shaded areas are indicative of the positions of the pressure antinodes for standing waves which might exist. These areas, therefore, represent unfavorable positions for a

Terminology

Before discussing the theoretical considerations and the results of the tests, a number of acoustical terms will be defined.

Fig. 1 shows the sinusoidal variations of pressure with time and those terms which may be clarified by illustration are shown on the figure.

1. *Oscillation* — periodic variation, with time, of pressure with respect to the ambient pressure. During oscillation, the pressure is alternately greater than and less than the ambient pressure.
2. *Pulsation* — here considered to be the observable effects of the pressure oscillations. That is, pulsations can be seen, felt, or heard by an observer, or measured as changes in pressure of the surrounding atmosphere or as forces exerted on surrounding surfaces. Since there are certain physiological implications connected with the term *pulsation*, the term *oscillation* is used in the subsequent discussion.
3. *Cycle* — complete sequence of values of pressure; at the end of a cycle, the pressure, the rate of change of pressure, and the direction of change of pressure have the same values that they did at the start.
4. *Period* — time interval consumed by one cycle.
5. *Frequency* — number of periods occurring in 1 sec, or number of cycles per second (cps).
6. Amplitude — absolute value of the maximum difference between the instantaneous static pressure and the ambient pressure in a given period. The variations in the instantaneous static pressure can be with respect to either time or space and the value of the amplitude need not be the same for both.
7. *Phase* — fractional part of a period through which the independent variable, usually time, has advanced, measured from an arbitrary origin. The origin is usually chosen so that the fraction is less than one.
8. *Wavelength* — distance between 2 wave fronts in which the pressures have a difference in phase of 1 complete period. During one period, the wave has advanced a distance equal to the product of the velocity of sound and the period.
9. *Standing Wave* — oscillations having a fixed distribution of amplitudes in space, and characterized by the existance of nodes and antinodes that are fixed in space.
10. *Nodes* — points, lines, or surfaces in a standing wave where the instantaneous pressure is equal to the ambient pressure during a given period.
11. *Antinodes* — points, lines, or surfaces in a standing wave where the instantaneous static pressure is equal to the amplitude during a given period.
12. *Natural Frequency* — the frequency at which a system will tend to oscillate when disturbed. The natural acoustic frequency of an enclosed space is a function of the configuration of the space.
13. *Resonance* — for this discussion, resonance can be considered to be a condition in a system where the frequency of a periodic, driving force on the system is equal to the natural frequency of the system. The effect of resonance is to cause oscillations of usually large magnitude in the system and to allow coupling for maximum energy transfer to take place between the system and the driving force.
14. *Resonant Frequency* — the frequency of the periodic driving force which causes a system to resonate.
15. *Mode Number* — a mode number is equal to the number of half wavelengths along a given dimension (in rectangular coordinates) for a given system.

furnace. As an example, Fig. 10 corresponds to the case of the oil furnace already discussed and Fig. 11 corresponds to the case of a gas furnace of similar size. An example of Fig. 12 would be an oil furnace located in a room the width of which was too large to neglect in determining the resonant frequency.

Application

By using the equation and plots which have been presented, it is often possible to predict the proper locations for oil and gas furnaces to give low noise level. In applying this theory, there are certain assumptions which can be made depending on the type of furnace used and the size of the room. Because of this, the oil and gas furnaces will be treated separately.

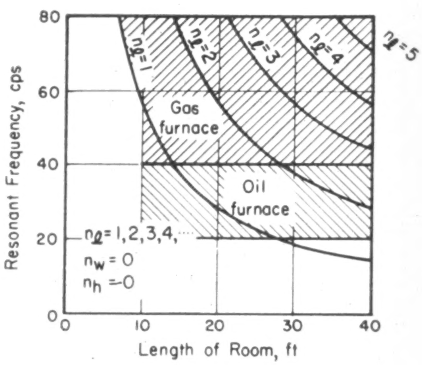


Fig. 7 — The resonant frequency of a room as a function of the length of the room

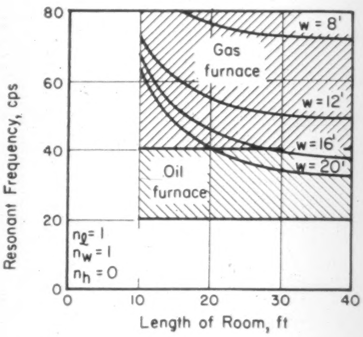


Fig. 8 — The resonant frequency of a room as a function of the length and width of the room

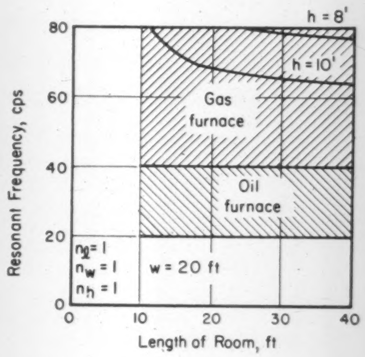


Fig 9 — The resonant frequency of a room as a function of the length, width, and height of the room

Oil Furnace: For an average size of room, the height is of no consequence in the determination of the number of modes of oscillation. Also, for rooms up to 40 ft long, the width need not be considered if it is under about 15 ft. Under these circumstances, Fig. 7 can be used. The figure shows that only 2 modes, the first and second, can exist in the range of frequencies of interest. For rooms between 14 and 28 ft in length, the first mode is possible. If the frequency of oscillation of the furnace is suspected to be such as to give coupling, the furnace should be equally spaced as nearly as possible between the 2 ends. For larger rooms, the second mode might be present which would cause a pressure antinode to appear in the center of the room as well as the ends. For this situation, the furnace might be placed at the quarter points.

For rooms wider than 15 ft, both Figs. 7 and 8 must be used in order to predict coupling. If a standing wave of this mode type is set up in the room, the pressure antinodes will appear in the 4 corners, as indicated in Fig. 12.

As a first example, consider the room which was used for the series of tests which have been described. As was previously mentioned, this room was about 25 ft long, 12 ft wide and 11 ft high. Since an oil furnace was used for these tests, the oscillating frequency would have been between 20 and 40 cps. Fig. 9 indicates that a room 11 ft high could not have a combined resonant frequency in this range. Therefore, the height of the room is of no consequence. Likewise, Fig. 8 shows that a room 12 ft wide would not have a combined resonant frequency below 40 cps. Therefore, the width of the room can also be neglected.

Using Fig. 7, it can be seen that a length of 25 ft will give a single mode of oscillation whose frequency is 21 cps. This is in reasonably close agreement with the observed value of 26 cps. The most probable reason for the discrepancy is the jog in wall A of the room, which shortens the wavelength of the sound wave somewhat.

As another example of the use of Figs. 7, 8, and 9 suppose an oil furnace, which was known to oscillate at a frequency of 30 cps, were to be placed in a room where dimensions are 30 ft long, 10 ft wide, and 8 ft high. Figs. 8 and 9 indicate that neither the width nor height of this room needs to be considered for a furnace oscillating at a frequency of 30 cps. Fig. 7 shows that there is no mode of oscillation close to 30 cps that can exist in a room 30 ft long; hence, no coupling should exist between the furnace and the room. If instead, the room had been 37 ft long, with the other dimensions the same, then trouble with the second mode of oscillation could be expected and the furnace should either be located near one of the quarter points, or a furnace of different oscillating frequency used. It should be added that a tolerance of at least ±4 ft is recommended when considering dimensions to prevent coupling. This is because of the wide peak in the frequency response curve around the resonant frequency, as shown in Fig. 4.

Gas Furnace: Because of the higher frequencies involved with gas furnaces, more possible modes of oscillation usually have to be considered than with oil furnaces. As a result, the analytical problem of determining the possibilities of coupling becomes somewhat more difficult. Since plots cannot adequately represent all the dimensional possibilities that can exist, the importance of the equation for determining room resonant frequencies cannot be overly emphasized.

For instance, Fig. 8 shows the modes $n_l = 1$, $n_w = 1$, $n_h = 0$; the modes $n_l = 2$, $n_w = 1$, $n_h = 0$ or $n_l = 1$, $n_w = 2$, $n_h = 0$, which would also be of interest in the case of a gas furnace, would require additional plots.

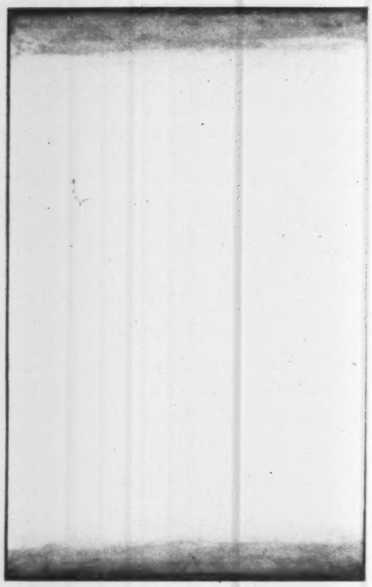


Fig. 10 — Sketch of positions of pressure antinodes for one dimension and the first mode of oscillation

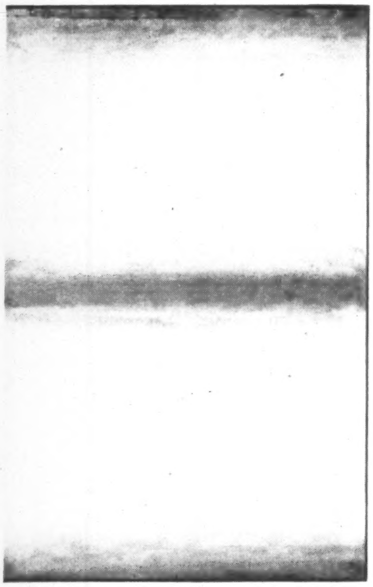


Fig. 11 — Sketch of positions of pressure antinodes for one dimension and the second mode of oscillation

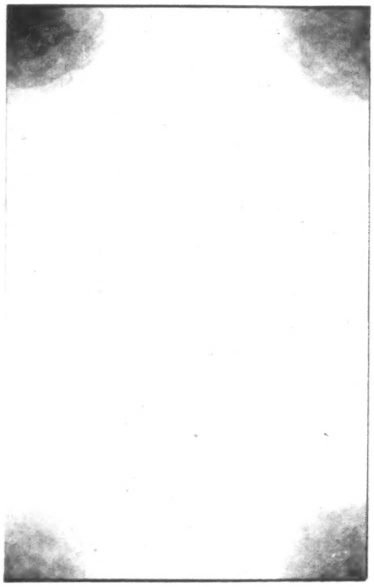


Fig. 12 — Sketch of positions of pressure antinodes for the first modes in two dimensions

As an example of the analytical procedure to be followed for a gas furnace, consider the 30-ft by 10-ft by 8-ft room discussed with reference to the oil furnace. Using Equation 1 and the first (1) modes of oscillation in 3 dimensions, the dimensions will give a resonant frequency of 91 cps. Because this frequency is greater than 80 cps, it is possible to have cases where the height of the room can be neglected; thus $n_h = 0$. If $n_h = 0$, the resonant frequency of the room will be lower and within the 40 to 80 cps range as is shown in Table 1.

It would therefore appear that a gas furnace with an oscillating frequency below about 52 cps would cause no coupling difficulty in the room at any location. On the other hand, for a furnace with an oscillating frequency of about 57 cps, the furnace should not be located at (*a*) the ends of the room or one-third the length from either end, (*b*) the long walls of the room, or (*c*) in the corners. These 3 results come from consideration of the regions of maximum pressure amplitude for the 3 different modes of oscillation at about 57 cps.

Rooms Other Than Rectangular in Shape: Many times, the room under consideration will not be rectangular in shape. From consideration of the results obtained in the test room, shown in Fig. 4, it would appear that the deviations from the ideal shape of the rectangle shown here may be neglected. The problem becomes more difficult when the room is more complex in shape. If the room, for instance, is L-shaped, 2 of the frequencies can probably be approximated quite closely by using the length and width of the room. A third frequency will probably be consistent with a mean length along the centerline of the 2 arms of the room.

Table 1 — Resonant Frequency of 30- x 10- x 8-ft Room for Gas Furnace

n_l	n_w	n_h	Frequency	Remarks
3	0	0	56	from Fig. 7
4	0	0	74	
0	1	0	56	from Fig. 7 using dimension of 10 ft
1	1	0	59	from Equation 1
2	1	0	67	
3	1	0	80	
1	1	1	91	

Calculation of all the possible modes of oscillation in these cases is impractical. The only satisfactory way to determine the various modes, frequencies, and corresponding points of maximum pressure amplitude is by use of a sound generator in the actual room to determine its resonant frequency, as was described in this report. It is also possible to get this information using a scale model of the room providing that the model is geometrically similar to the actual room. It should be added that the frequencies obtained in this manner will be proportional to the actual frequencies; the proportionality constant is the inverse of the scale factor of the model.

Determining the Natural Frequency of a Furnace: If it is desired to determine the natural frequency of a furnace to a closer value than the range of scatter that is indicated by Fig. 2. then the most economical means is probably the use of electronic sound-measuring equipment in the manner similar to that discussed in the earlier paper.[1] On the other hand, it is feasible to install the furnace at one end of a solidly built corridor, and move a heavy wall in from the other end. Having determined the length of the corridor for which the amplitude appeared largest to the ear, the natural frequency could be determined from Fig. 7. The movable wall, however, would have to be of concrete block or similar construction, probably mounted temporarily on a lift truck. The fit to the edges of the corridor at each test point would have to be such that the gap did not exceed one quarter to one-half in.

Concluding Remarks

It has been shown that coupling can occur between a residential furnace-burner unit and the room in which it is placed. When such a condition exists, a normally quiet unit may be entirely unsatisfactory for the given installation. Once the furnace-burner unit is installed, it is often impractical to relocate the unit to give lower noise levels. In situations of this nature, it might be possible to build a partition in the room which will break up the standing waves. Such a wall could have the additional advantage to the consumer of concealing the equipment.

A more direct application of this paper may be found for those people who install units large enough to justify the cost of investigating possible positions of the unit to give low noise levels before the units are installed.

Another application of this material would be as another tool in *trouble-shooting*. Considerable time might be saved with unusually noisy units if the possibility of coupling between the room and furnace were checked out early in the investigation of the noise problem. One symptom which would be an indication of coupling would be the appearance in some areas of the room, possibly quite far from the furnace, where the noise level would be high, whereas in other positions, possibly quite close to the furnace, the noise level would be considerably lower.

Acknowledgment

The able assistance of the members of the Pulsation Research Steering Subcommittee of the TAC on Combustion of ASHAE in guiding the research and providing necessary information and materials is gratefully acknowledged.

ATOMIC SPACE HEATING AT HANFORD

In the *General Electric Review* for November 1956, under the title *Space Heating With the Atom*, S. L. Nelson describes at some length the installation at Hanford, Wash., where atomic energy is the source of heat supplied to buildings. It is believed that this is the first installation in the United States in which buildings are heated with energy from an atomic source. The author points out that heating with atomic energy is relatively simple compared with obtaining the atomic power itself.

The installation at Hanford, the principle of which is shown diagrammatically in the article, makes use of ethylene glycol as the agent for circulating through the building heating system. This ethylene glycol in turn derives its heat by way of an exchanger from high temperature water which has been used to cool the reactor and is rejected to the river. In other words, the source of the building heat is from the waste heat from the reactor.

Only a small fraction of the waste heat is actually used at Hanford. Much more of it could be used if desired. Even so, the quantity of heat exchanged is sizeable since it is indicated that the design specifications at the main exchanger call for the transfer of a minimum of 50-million Btu per hour and that this quantity of heat is transferred to nearly 6000 gpm of ethylene glycol solution. The glycol solution enters the exchanger at 120 F.

Distribution piping is uninsulated and is run through tunnels or buried under ground. The author indicates that experience at the Hanford installation has not brought to light any operational or maintenance difficulties and that the equipment generally was selected with an eye toward minimum maintenance requirement.

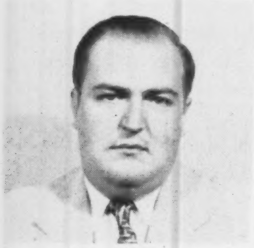
The author makes some interesting observations concerning what he believes may happen in the future in connection with space heating with atomic energy. He indicates that to him it seems clear that the use of atomic energy for heating large hotels, office buildings, and other areas where space heating requirements are large with respect to area is feasible now. He feels that such installations will become economically practical in time to come. It would seem that military needs must be taken care of before atomic fuels can be made available for building heating and that the economics must be worked out as must also methods of adequate inspection and safety. The author believes that it has been demonstrated that from a technologic point of view a long-life low-powered safe reactor suitable for space heating can be produced. He states that the remaining problems therefore are the economics and an adequate fuel supply.

Journal Section

CARL W. MACPHEE

Early in January 1957, Carl W. MacPhee joined the staff at the headquarters office as technical assistant. Everyone on the staff at headquarters, as well as the Officers and Council, is pleased to join in welcoming Mr. MacPhee.

After attending the University of Maine, and serving in the Navy, Mr. MacPhee



C. W. MacPhee

received the degree of BME from Rensselaer Polytechnic Institute in 1947.

Mr. MacPhee comes to the Society with a background of having been active in various phases of heating, ventilating and air conditioning for the past 10 years. This experience has included work in sales engineering and in client liaison, in equipment selection, cost and material estimation, specification writing, and field supervision. He has thus obtained a thorough familiarity with all the engineering design facets of the heating, ventilating and air-conditioning field.

During the course of his experience, Mr. MacPhee has been connected with the K & S Cooling Corp., J. M. Steinhardt & Co., Edward E. Ashley Consulting Engineers, S. J. O'Brien Sales Corp., and with the design engineering of U. S. Rubber Company.

As technical assistant, it is expected that Mr. MacPhee will receive assignments in connection with the preparation of material for THE GUIDE, and also that he will deal with the activities of the Society in connection with standards and codes.

It is expected that with his joining the staff, it will be possible to increase the services of the headquarters office to the membership.

ASHAE-*AIA* JOINT COMMITTEE ON COOPERATION MEETS

The first meeting of this joint committee was held at the headquarters of the *American Institute of Architects* in Washington on December 13th. Since this was the initial meeting, the matter of the objective of the Committee was discussed with the result that the objective was stated to be *To encourage cooperation between architects, consulting engineers, and the air conditioning industry.*

Members of the Committee were assigned the task of preparing reports for submission to the whole Committee on (1) cost of air conditioning and increased efficiency resulting from the air conditioning of commercial and industrial buildings; (2) standards for the air conditioning of buildings including temperature, humidity, cleanliness, air movement and noise levels — (this information to be subdivided by geographical areas of the country and by types of buildings and their use and occupancy, and to include cautionary information concerning the effect of light loads, window areas, insulation, etc. on the cost and effectiveness of air conditioning); (3) additional cost of installing and operating an air-conditioning system in buildings with large glass areas using typical building sections as examples; (4) preparation of a talk for meetings of architects on *What is Air Conditioning* including brief discussions on the purpose, types, costs, effectiveness, productivity of workers.

It was agreed that the Committee discussions and studies would be limited to new buildings since an architect is seldom concerned greatly with air conditioning of existing buildings, and that the greatest immediate need is the education of architects on the various phases of air conditioning with which they are, or should be, concerned.

In attendance at the meeting, and representing ASHAE, were John E. Haines, co-chairman; C. B. Gamble and H. C. Hoffmann.

QUEBEC CHAPTER RECEIVES ITS CHARTER

The 66th Chapter organized at Quebec, P. Q., Canada, December 13, 1956, is the first to have its official name in French, *viz*: *Chapitre de la Ville de Quebec*. In view of this the following account of the charter meeting is also presented in French.

Pres. John W. James presents charter of the Chapitre de la Ville de Québec to its first secretary, P. J. Lamarche, at its charter meeting

Un groupe d'ingénieurs et de techniciens en chauffage et air-conditionné se réunissaient le 13 décembre dernier pour accueillir les membres de la Société Nationale de l'AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS à l'occasion de l'inauguration du premier chapitre français de l'Amérique.

Cette réception avait été organisée par l'exécutif temporaire du chapitre lequel était représenté par Philippe Lamarche, président, Jean Veilleux, Ing.P., secrétaire et Maurice Paquet, Ing.P., trésorier.

Les agapes eurent lieu au Cercle Universitaire "Québec", à 65, rue d'Auteuil et débutèrent à 6:00 heures p.m. M. Lamarche entonna l'hymne national *O CANADA* qui fut suivi par la récitation du Benedicite. Le diner fut servi à 7:15 heures p.m. dans une des magnifiques salles du Cercle spécialement décorée pour la circonstance d'un monument de glace d'environ cinq pieds de hauteur et qui représentait l'écusson de l'ASHAE; deux castors également de glace, d'environ trente pouces de hauteur, escortaïent l'écusson. Un puits de lumière, à l'arrière-plan, faisait resplendir magnifiquement tout l'ensemble. Le repas, préparé avec goût et fort soigneusement, fit les délices de tous lès gourmets.

Vers la fin du diner, Philippe Lamarche, en sa qualité de président, présenta alors tous les invités d'honneur qui étaient: Guy Dubeau, président de *Illuminating Engineers Institute;* Dr. Albert Cholette, directeur du département de Génie Chimique de l'Université Laval; Louis-Philippe Bonneau, président d'*Engineering Institute of Canada*, vice-doyen de la Faculté des Sciences de Laval et directeur du départment de mécanique à cette même Université; D. Lorne Lindsay, ex-président du Chapitre de Montreal; A. V. Hutchinson, secrétaire-exécutif de l'ASHAE; Maurice Paquet, Ing.P., trésorier temporaire du Chapitre de la Ville de Québec; E. R. Queer, 2ième vice-président de l'ASHAE, président du Comité Central des Régions, directeur et professeur en recherches scientifiques au Pennsylvania State University; Philippe Lamarche, gérant du Minneapolis-Honeywell Regulator Company et président temporaire du Chapitre

Society Officers and Officers of newly organized Chapitre de la Ville de Québec at its charter meeting, December 13, 1956. *(l. to r.)* John H. Fox, member of Council; A. V. Hutchinson, ASHAE executive secretary; John W. James, ASHAE president; Jean Veilleux, president of new chapter; E. R. Queer, 2nd vice president of ASHAE; P. J. Lamarche and Maurice Paquet, vice president and treasurer of newly formed Chapitre de la Ville de Québec

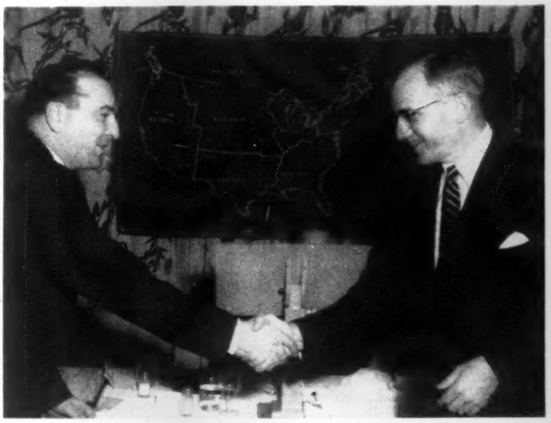
de la Ville de Québec; John W. James, président de l'ASHAE pour 1956, vice-président en charge des recherches pour McDonnell & Miller, Inc. à Chicago, ingénieur professionnel dans les états de l'Oregon et de l'Ohio; Jean Veilleux, Ing.P., président de l'*Institute of Power Engineers,* branch de Québec, pour 1956, secrétaire temporaire du chapitre de la Ville de Québec; John H. Fox, Ing.P., directeur régional de l'ASHAE (Région 7) et président de la Corporation des Ingénieurs Professionnels pour l'Ontario; Pierre Bournival, Ing.P., secrétaire général de la Corporation des Ingénieurs Professionnels de la Province de Québec; Gérard Venne, architecte, premier vice-président de l'*Association des Architectes de Québec;* W. G. Hole, Ing.P., gouverneur du Chapitre de Montréal et membre candidat du conseil; A. DeBreyne, Ing.P., secrétaire du Chapitre de Montréal; H. G. S. Murray, gouverneur du Chapitre de Montréal; N. K. Smith, du Chapitre de Montréal; and R. J. Kerr, gouverneur du Chapitre de Montréal.

M. Lamarche propose ensuite un *toast* à la Raine et remercie les commanditaires d'avoir eu la gracieuseté d'offrir le cocktail et le vin.

Une fois le diner terminé, M. Lamarche présente le premier invité d'honneur, John W. James, président de l'ASHAE.

M. James prend alors la parole pour souhaiter la bienvenue au nouveau groupe de Québec, au nom des 11,000 membres de la Société. Il déclare que tous les ingénieurs de l'ASHAE peuvent faire beaucoup pour l'amélioration et le bien-être de la population dans le domaine de la ventilation, du chauffage et de l'air climatisé. Il insiste sur les bienfaits de l'air climatisé dans les écoles, les hôpitaux et dans l'industrie en général, et souligne l'efficacité du système en rendement obtenu dans les manufactures où employés et patrons doivent peiner la majeure partie du temps. M. James présente ensuite à M. Lamarche, président temporaire, la charte du Chapitre de la Ville de Québec et à partir de ce moment, il préside l'assemblée à titre de président de la Société Nationale.

Au nom de tous les membres et futurs membres du Chapitre de la Ville de Québec, M. Lamarche remercie l'exécutif national pour la charte obtenue qui représente un symbole d'unité et de progrès dans le perfectionnement des sciences du chauffage et d'air climatisé. Il exprime sa satisfaction en constatant l'appellation française de la charte qui, dorénavant, permettra au nouveau chapitre de tenir toutes ses délibérations dans leur langue maternelle, et il remercie tout spécialement M. Hutchinson pour sa collaboration.



Pres. John W. James greets Jean Veilleux as newly elected president of the Chapitre de la Ville de Québec at its charter meeting, December 13, 1956

Il fait ensuite l'historique du nouveau chapitre qui débuta avec cinq membres et qui est maintenant de 30 membres avec un objectif immédiat de 50 membres, et s'adressant au Chapitre de Montréal, il dit: "At the outset, we had expert guidance from Mr. Kerr, past president of the Montreal Chapter, as well as John Fox, regional director. Bob Kerr attended one of our early organizational meetings while John Fox was our very first speaker at a dinner meeting. John was instrumental in sealing the issue by recommending the formation of this chapter."

Et il affirme ensuite être sûr que ce 66ième chapitre sera très progressif et atteindra les buts généraux de la Société.

Monsieur Lamarche mentionne ensuite les noms des membres du Conseil National ainsi que tous les autres chapitres qui nous ont adressé leurs voeux de succès pour la circonstance.

M. James présente ensuite E. R. Queer, 2ième vice-prèsident de l'ASHAE et président du Comité Central, qui prend la parole pour expliquer le nouveau rôle du Chapitre de la Ville de Québec sous le plan régeional de la Société, ainsi que la hiérarchie des membres du Conseil National et son organisation.

M. James présente ensuite M. Hutchinson, secrétaire-exécutif de la Société, qui explique à son tour le rôle de chaque chapitre dans leur localité. Il nous fait part que la Convention de la Région 7 sera tenue en mars prochain à Ottawa.

M. James présente alors John H. Fox comme directeur de la région canadienne, qui nous traduit les différentes responsabilités des directeurs régionaux.

Le président, M. James, nomme ensuite les deux scrutateurs pour l'élection du nouveau chapitre, soit Louis Truchon et A. Servant. Monsieur Lucien Larocque agit comme président de l'élection.

Pendant la tenue du scrutin, M. James demande à Pierre Bournival d'adresser la parole à titre de secrétaire général de la Corporation des Ingénieurs Professionnels du Québec. M. Bournival transmet alors les voeux de succès et de félicitations au nouveau chapitre et il précise la position exacte de chaque société envers la Corporation qu'il représente, et qui veut qu'aucun membre d'une société formée d'ingénieurs, de techniciens, etc., se serve d'un titre professionnel ou autre s'il n'est pas qualifié par des études spécialisées et diplômé.

M. James s'adresse ensuite à L. P. Bonneau et lui demande de nous dire un mot à titre de président de l'*Engineer-*

ing Institute of Canada. Ce dernier exprime ses espoirs que le nouveau chapitre fera tout en son pouvoir pour l'amélioration générale industrielle et pour l'avancement scientifique, et il souhaite à tous un franc succès.

M. Laroque entre alors dans la salle pour annoncer le résultat de l'élection et il informe l'assemblée que: Jean Veilleux est élu président; Philippe Lamarche, vice-président; Roland Harnois, secrétaire; Maurice Paquet, trésorier; et que L. P. Bonneau, O. Dorval, E. Fournier, M. Royer, Y. Tassé sont élus directeurs.

M. Fox présenta ensuite le Conseil 57 au président national, M. James.

Jean Veilleux se lève alors pour présider l'assemblée et s'exprime en ces termes: "Il m'est infiniment agréable de remercier tous les membres de notre chapitre pour l'honneur qu'ils me font de m'élire à la présidence du premier chapitre francais de l'American Society of Heating and Air-Conditioning Engineers, *le Chapitre de la Ville de Québec.*"

Et continuant en anglais, il dit: "I wish to express the gratitude of all our members to the National Executive Committee for having presented us with a charter, which will now permit us to keep posted on the developments which may occur in the fields every one of us may be interested in. I also wish to welcome here the representatives of the Montreal Chapter, who have accepted so kindly to attend to the inauguration of our chapter."

Il salue ensuite tous les invités d'honneur et il termine en disant: "The executive Committee of our French Chapter, now elected, wish to assure the National Executive Committee of their full cooperation towards the success each and every one has so much at heart."

Et il remercie tous les membres pour ce témoignage de confiance qui lui est très sensible et auquel espère faire honneur.

M. James présente ensuite au président du nouveau chapitre le maillet donné par le 65e chapitre de la Société, en l'occurrence, l'El Paso Chapter.

M. Veilleux remercie en ces termes: "I thank you most sincerely for this small mallet, which, I am sure, will be quite useful for the good discipline of our meetings. As president of a newborn chapter, I feel this gavel will lend me the mastership required to handle the stormy questions as well as to stress attention. Should need to serve its purpose be lacking, it will nevertheless give character to our meetings and I thank you again for this symbol which talks louder than words."

Les règlements du nouveau chapitre étant connus mais n'étant pas à la disposition des membres pour lecture générale, le président déclare qu'ils seront acceptés par l'exécutif à leur prochaine assemblée.

Il demande ensuite au secrétaire du Chapitre de Montréal, A. DeBreyne, d'adresser la parole à l'assemblée.

M. DeBreyne se déclare heureux que la Société possède maintenant un chapitre francais dont leurs membres pourront bénéficier lors de leurs voyages d'affaires à Québec et il traduit les voeux de succès de ses confrères en remettant au président un chèque pour la somme de cent dollars.

Le président se lève alors pour dire: "Au nom de tous les membres du Chapitre de la Ville de Québec, je remercie tous les membres et les officiers du Chapitre de Montréal, pour la généreuse collaboration qu'ils viennent de nous accorder. Évidemment, nous en avions bien besoin pour débuter d'une manière décente. Veuillez croire, Messieurs, que nous verrons à utiliser votre précieuse contribution à bon escient. Cordial thanks to the Montreal Branch for this most generous help."

Il s'adresse ensuite à tous les membres de l'exécutif national qu'il remercie pour leur généreuse coopération et collaboration et demande à un des membres du Chapitre de la Ville de Québec, Jean Beaudoin, de parler des Carnavalades 1957.

M. Beaudoin invite tous les officiers et membres de l'extérieur à nous visiter pendant le Carnaval qui débute généralement en janvier pour se poursuivre avec plus d'intensité jusqu'au mardi-gras et il présente à MM. James, Queer, Hutchinson et Fox les bonnets traditionnels qui caractérisent si bien le Carnaval de Québec.

Le président déclare ensuite que l'assemblée est levée.

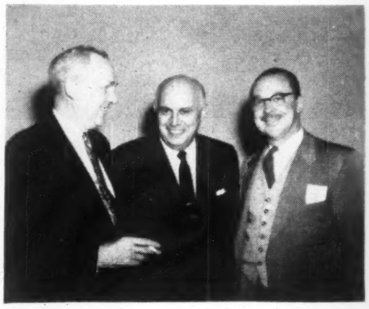
ACTIVITIES OF SOCIETY CHAPTERS

Programs held at recent chapter meetings covered a number of subjects of general interest to the membership. Some chapters offered guest speakers, while others featured tours, films, or visits from Society officers. Highlights of these programs are covered here, along with some personal items connected with the meetings.

Speakers

The West Coast Noise Symposium held in Los Angeles was the topic of considerable interest discussed at an ARIZONA Chapter meeting. The guest speaker, Vance Smith, general manager, Utility Fan Corp., a division of Utility Appliance Corp., Los Angeles, covered the matter from the fan manufacturer's standpoint, with particular reference to the fan laws and applications. J. M. Huff, Albuquerque, N. Mex., gave a resume of the symposium. ● ● ● Advice on the *Selection of Proper Heat Exchanger for the Job* was given to the ARKANSAS Chapter members by J. B. Killebrew, president, Killebrew Engineering Corp., St. Louis, Mo. Mr. Killebrew presented a program on the design and manufacture of industrial heat exchangers, pressure vessels and water heaters. ● ● ● The present-day condition of Egypt was treated by an ATLANTA Chapter speaker, Fred Bellinger, Georgia Institute of Technology Engineering Experiment Station. Dr. Bellinger's commentary on Egyptian religion, history, and customs, as well as present conditions of agriculture, industry and politics, provided those present with a clear picture of Egypt in this modern world. ● ● ● A BATON ROUGE program featured a talk by W. W. Kennedy on *High Pressure Air Distribution.* The speaker pointed out that high velocity systems evolved as a result of space limitations and that space conservation remains the major advantage for such systems. Mr. Kennedy's clearly-presented material was well accepted by the membership. ● ● ● J. H. Fox, member of Council and regional director of Region 7, Chapters Regional Committee, outlined the operation of the Society under the regional system for the benefit of his BRITISH COLUMBIA audience. The guest speaker at this chapter meeting was B. E. Judges, manager, refrigeration sales, Trane Company of Canada, Ltd., Toronto, Ontario. Mr. Judges outlined the general principles of refrigeration, and described various types of refrigeration machines and refrigerants, showing the type of machine used to handle each refrigerant. At the conclusion of this talk, Pres. D. W. Thomson commented briefly on the effect of modern building design trends on the local market condition for comfort cooling equipment. ● ● ● CENTRAL NEW YORK Chapter members heard Victor Cole, product specialist, Carrier Corporation, Syracuse, N.Y., whose topic was *Automatic Absorption Refrigerating Machines for Air Conditioning.* Mr. Cole's clearcut account of absorption refrigeration was accompanied by a series of installation photographs and diagrams on slides. ● ● ● P. W. Crumlish, Joy Manufacturing Co., Pittsburgh, Pa., addressed a CINCINNATI audience on *Industrial Ventilation and the Vane Axial Fan.* A lively question and answer approach was maintained throughout the talk. ● ● ● At a joint *ASRE-ASHAE* meeting, DELTA Chapter members and their guests enjoyed a talk on *Activated Charcoal Filter* by H. L. Barnebey, vice president, Barnebey-Cheney Co., Columbus, Ohio. ● ● ● J. W. May, director of technical training, American Air Filter Co., Louisville, Ky., delivered his presentation on the *Selection and Application of Air Filters* at an EL PASO Chapter meeting. ● ● ● A guest at a recent ILLINOIS Chapter meeting, A. V. Hutchinson, executive secretary of the Society, complimented the chapter for their attendance, expressing the hope that the turnout for the 63rd Annual Meeting would also be good. The speaker of the evening, D. N. Crosthwait, technical adviser, Dunham-Bush, Inc., presented a

fundamental discussion on high temperature hot water heating. Mr. Crosthwait named the advantages and disadvantages of such a system, and emphasized the individuality of each installation and its requirements. • • • The coffee speaker at an INDIANA Chapter meeting, Dan Kibler, a member of the Mayor's Traffic Improvement Committee, informed his audience on Indianapolis traffic conditions. The members also heard J. W. May, director of technical training, American Air Filter Co., Inc., Louisville, Ky., who spoke on the *Selection and Application of Air Filters.* • • • *The Four Freedoms of Electronics* were outlined by C. M. Sanders, Jr., western manager, Transportation Division, Minneapolis-Honeywell Regulator Co., Chicago, for the IOWA Chapter. These were the freedoms of response, construction, application and supervision. The chapter also heard John E. Haines, regional director, Region 3, Chapters Regional Committee, and immediate past president of ASHAE, give a short report on *What is Air Conditioning?* • • • An illustsated talk on *Air Movement in Ventilating and Heating* was presented before the KANSAS Chapter by E. K. Campbell, chairman of the board, E. K. Campbell Co., Kansas City, Mo. • • • J. H. Fox, regional director, Region 7, Chapters Regional Committee, explained the regional plan to the MANITOBA Chapter. Mr. Fox mentioned the shifting of part of the monumental load from the shoulders of the Society president to the regional directors, and the benefit to the chapters from closer personal contact with Society affairs. • • • Members of the MASSACHUSETTS Chapter heard John Everetts, Jr., engineer, associated with Charles S. Leopold, consulting engineer, Philadelphia, Pa. Mr. Everetts, who is a member of Council and regional director, Region 1, Chapters Regional Committee, spoke on high velocity high pressure air distribution, its advantages, cost, and requirements in comparison with low velocity systems. • • • R. E. Wiltrout, assistant to the president, Ric-Wil Co., Barberton, Ohio, gave a talk and slide presentation before the MIAMI VALLEY Chapter on conduit installations. • • • A panel discussion on *Written Specifications* at a MICHIGAN Chapter meeting was moderated by R. H. Oberschulte, who emphasized that written specifications are a vital part of the construction industry. The panel members were E. M. Tennant, covering the history of specifications; J. S. Bobbio, who named the requirements of a good specification; J. S. Blossom, making a plea for clarity in specification writing; and E. F. Glanz, who told of the need for the authorization of legitimate extras in the preparation of specifications. • • • At another meeting of the Michigan Chapter, John Everetts, Jr., gave his talk on the *Economics of High Velocity Air Conditioning*, and C. H. Pesterfield, professor of mechanical engineering, Michigan State University, East Lansing, Mich., briefly covered the activities of Region 2. • • • *Design and Warm Air Heating Plants* was the topic selected by L. G. Miller, dean emeritus engineering, Michigan State University, for an address before the MINNESOTA Chapter. • • • D. F. Ingram, sales engineer, Johnson Service Co., Jackson, Miss., brought the MISSISSIPPI Chapter up to date on *New Developments and Unusual Applications of Pneumatic Temperature Controls.* • • • A member of the MONTREAL Chapter, Richard Thorn, spoke to his fellow members on the application of high velocity ventilation for schools, and demonstrated the use of activated carbon filters in removing odors and permitting recirculation of air with a considerable saving in fuel. A color film of the Pointe Claire High School installation served to illustrate the physical aspects involved, particularly air distribution and the principle of room air aspiration. • • • As guest speaker at a NEBRASKA Chapter meeting, H. J. Scott, Missouri district engineer, Bituminous Coal Institute, gave a comprehensive coverage of the methods of burning and handling coal and the economy of coal usage. • • • On a different occasion Nebraska Chapter members enjoyed a nontechnical presentation on the *Alaska Big Game Hunt*, by fellow member M. J. Olson, partner, Olson Bros., Inc., Omaha, Nebr. Mr. Olson showed color films of his recent hunting trip to Alaska, and replied to questions concerning Alaskan weather, fauna and flora. • • • A general membership meeting, including the wives and friends of the members, proved to be a successful innovation for the NORTH JERSEY Chapter. The outstanding feature of the evening was a talk given by L. P. Shannon, E. I. du Pont de Nemours & Co., Wilmington, Del. Mr. Shannon spoke on chemical research and its importance to the future of America. • • • Economics took the NORTH TEXAS spotlight. At a meeting in Dallas, A. A. Smith, economist and vice president, First National Bank, treated economics in general, the changes in circumstances over the last 25 years that have had such an effect on our lives, the present prosperity and future prospects. • • • NORTHEASTERN OKLAHOMA Chapter programmed a *Report on Recommendations for More Economical Means of Providing Heating and Ventilating Systems for the Tulsa Public School System*, which was ably presented by a committee consisting of J. C. Netherton, Jr., W. C. Roads, J. D. Ryan and R. L. Sigler. • • • *Nuclear Power* was the subject of an address by D. B. Scott, professor of physics, University of Alberta, before a NORTHERN ALBERTA Chapter audience. Dr. Scott explained the processes of fission and fusion, and analyzed the possibilities of the use of atomic reactors in the production of power. He also discussed the possible use of atomic power in aircraft, automobiles and locomotives. • • • A presentation on *The Progress of the Natural Gas Industry in the Piedmont* was given before the NORTHERN PIEDMONT Chapter by J. G. Hopping, Jr., industrial engineer, Piedmont Natural Gas Co., Inc., Charlotte, N. C. • • • *Schoolhouse Planning* received the consideration of the OKLAHOMA Chapter. Z. A. Marsh, director of school activities, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., addressed himself to this topic in a talk which proved to be of wide interest. Mr. Marsh, who is chairman of the School Facilities Council of Architecture, Education & Industry, emphasized the need for a merging of viewpoints from the taxpayer,



1st Vice Pres. P. B. Gordon *(center)* with R. O. McGary *(left)* and L. F. Lawrence, both of Charlotte, N.C., at the Joint Meeting of the Northern and Southern Piedmont and South Carolina Chapters, held recently at the Elks Club, Charlotte, headquarters city of Southern Piedmont Chapter

1st Vice Pres. P. B. Gordon at registration desk during Joint Meeting of Northern and Southern Piedmont and South Carolina Chapters at which he spoke on "The Chapter and the New Regional Plan," with E. D. Streng *(seated)* and J. A. Rice *(standing)*, secretary and president of Southern Piedmont Chapter during 1956 season *(Photos Courtesy W. M. Wallace, II)*

educator, industry, architect and engineer. Interest from a local level developed from the meeting. • • • W. H. Evans, president, Honeywell Controls Ltd., enlightened his ONTARIO audience on *Canada's Position on Technical Manpower.* Mr. Evans' talk was highly informative. • • • A panel of 3 speakers, covering the general subject of *Firm Specifications,* was featured by the PACIFIC NORTHWEST Chapter. The introductions were made by E. W. Triol, first vice president and program chairman. D. W. Pingrey, supervisor, estimating department, Lincoln Bouillon & Associates, Seattle, Wash., presented the engineer's viewpoint, defined the term 'specifications' and discussed 3 major types of specifications. The second speaker, K. G. Massart, engineer and estimator, L. G. Massart Plumbing & Heating Co., Seattle, representing the contractor's viewpoint, demonstrated undesirable features of the base bid specification. Finally, D. F. Owens, manager, The Trane Co., Seattle, for the material supplier's point of view, favored the base bid. Discussion following the talks had to be halted by Pres. L. F. Christofferson because of the lateness of the hour. • • • D. H. Vance, vice president and executive engineer, The Korfund Co., Inc., Long Island City, N. Y., spoke to a PHILADELPHIA Chapter audience on the subject of *Vibration and Noise Control for Air Conditioning Equipment.* • • • PITTSBURGH Chapter members heard R. D. Lemmerman, manager, Koppers Co., Inc., industrial sound control department, Baltimore, Md. Mr. Lemmerman gave a pleasant and informative talk on *Sound Control,* with accompanying graphic slides. • • • Danger from radioactive material transported by air flow and gravity can be controlled by ventilation and building design, according to Robert Walker, The Dow Chemical Co., Midland, Mich. Speaking to a ROCKY MOUNTAIN Chapter audience on *Ventilation Criteria for Buildings Handling Radioactive Materials,* Mr. Walker defined the basic dangers in a plant using low-level radioactive materials. • • • M. J. Delavan, who spoke briefly before the SACRAMENTO VALLEY Chapter on boiler ratings, later introduced the main speaker, G. F. Carlson, engineer, Bell & Gossett Co., Morton Grove, Ill. Mr. Carlson gave an enlightening talk on hot water heating systems. He especially emphasized where the pump should be placed in relation to the boiler and what effect it has on the pressures encountered throughout the system. • • • John E. Haines, past president of the Society and regional director, Region 3, was guest speaker at a ST. LOUIS Chapter meeting. Past Pres. Haines, vice president, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., gave a short history of air conditioning and a complete analysis of the air-conditioning potential in this country. • • • The executive vice president of the Air Conditioning Council of Houston, Don West, addressed the SOUTH TEXAS Chapter members and guests. Mr. West reviewed the action the Council has taken in an effort to promote the licensing and bonding of all air-conditioning contractors. • • • Four speakers graced the SOUTHERN CALIFORNIA rostrum. R. S. Dawson spoke on problems involved in installing and testing a refrigeration cycle. C. J. Otterholm devoted his time to water circulating systems, and W. M. Christensen covered the testing and adjusting of a heating system. The last speaker, Joseph Molocznik, treated the testing and balancing of the air cycle. Following the talks, numerous questions were addressed to all the speakers. • • • Information on *Heating, Ventilating and Air Conditioning for Shopping Centers* was given to the TOLEDO Chapter by J. B. Olivieri, chief mechanical engineer, Victor Gruen Associates, Detroit, Mich. Mr. Olivieri classified shopping centers with regard to physical arrangement to include 3 types — strip, mall and cluster. He told of the extensive planning required to produce a shopping center, and the number of persons who are directly concerned with it. • • • The *Shortage of Engineers* was brought into focus by Martin Mason, dean, School of Engineering, George Washington University, Washington, D.C. Dr. Mason told the members of the WASHINGTON, D.C. Chapter that the average industry seeking engineers today spends approximately $15,000 per company to recruit 1 engineer who has graduated within the last 2 years. • • • WESTERN MICHIGAN Chapter also enjoyed the talk presented to the Toledo Chapter by J. B. Olivieri. • • • *Design Coordination* was the subject of a talk by L. F. Flagg, supervisor, commercial field training, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. Mr. Flagg stressed the need for coordination of all phases of the industry to give the owner the results he should expect. He also noted the advisability of considering all the phases of the problem in the initial design, rather than being put in the embarrassing position of having to correct a deficiency at some later date.

Northern and Southern Piedmont Chapter members get together after luncheon in honor of 1st Vice Pres. P. B. Gordon, New York, at the Charlotte, N.C. City Club. Seated *(l. to r.) Seated:* G. C. Garrett, Southern Piedmont vice president; 1st Vice President Gordon; J. A. Rice, Southern Piedmont president; L. R. Gorrell, Northern Piedmont president. *Standing:* C. E. Petty, Southern Piedmont program chairman; R. B. Rice, state secretary, North Carolina Professional Engineers Board of Examiners; R. O. McGary, Charlotte; C. A. Cofer, Northern Piedmont vice president; E. D. Streng, Southern Piedmont secretary; G. N. Payne, Jr., member of the board of governers of Southern Piedmont Chapter

Tours

CINCINNATI and MIAMI VALLEY Chapters arranged a joint meeting and tour. At the meeting, Pres. J. B. Rishel, Miami Valley Chapter, introduced the officers of both chapters, and Pres. R. C. Anderson, Cincinnati Chapter, proposed that the joint meeting be made an annual event. C. H. Pesterfield, regional director, Region 2, Chapters Regional Committee, gave a short talk on the activities of the regional committees. Following the brief meeting, the members enjoyed a conducted tour through the Armco Steel Corporation Plant, Middletown, Ohio. They viewed the complete operation from coke processing to the finished rolling mill. • • • Previous to their regular meeting, members of the CONNECTICUT Chapter toured the Fafnir Bearing Co., Farmington, Conn. During the proceedings following, E. M. Johnson, program chairman, introduced those who were responsible for the day's program: Russell Downs, Harold King, George Ralley and Warren Hibbard of the Fafnir Bearing Co. To complete the program, a film on the bearing manufacturing process was shown. • • • The traveling Connecticut Chapter went to Bridgeport, Conn., on another occasion. There the members inspected the Bullard Company's new foundry and saw a film on foundry operations. John Bullard welcomed the Society to the plant, and Frank Olson, foundry superintendent, described the construction and operation of the foundry. • • • In reply to an invitation from *AIEE's* Memphis Chapter, members of the MEMPHIS Chapter of ASHAE enjoyed a joint tour of the new Southern Bell Telephone long distance and local dial exchange. ASHAE members greatly appreciated the friendly gesture on the part of the *AIEE* chapter and the courteous manner in which they were received. • • • A brief outline of the mechanical facilities of the new Ste. Justine's Hospital was presented before the MONTREAL Chapter audience by Guy Montpetit, engineer, Leblanc & Montpetit, Montreal, Que. After the talk, the meeting reconvened at the hospital for a tour of inspection of these mechanical services. • • • Eighty-one members and guests of the NORTH JERSEY Chapter assembled at the Anheuser Busch Brewery for a conducted tour of the entire plant, including the engine room. They witnessed many of the important steps in processing and brewing beer. • • • Pres. L. R. Gorrell, NORTHERN PIEDMONT Chapter, welcomed the attendance at the chapter meeting of student members from North Carolina State College and Duke University. R. B. Knight, professor of mechanical engineering, North Carolina State College, Raleigh, N.C., acted as program chairman for this meeting. Professor Knight introduced T. C. Powell, Jr., consulting engineer, Raleigh, N.C., who described the heating and air-conditioning system for the new Occidental Life Insurance Company Office Building in Cameron Village. The speaker pointed out several interesting architectural details of the building. Afterwards, the meeting was adjourned to the Occidental Building for a guided tour. • • • NORTH CAROLINA STATE COLLEGE Student Branch members had the opportunity to examine the State College power plant. Frank Kennedy, director of the power plant, conducted the group on a tour of the massive project. • • • A highly informative talk on the installation of the new air-conditioning system in the existing administration building at Purdue University was presented to PURDUE UNIVERSITY Student Branch members by G. B. Supple, district manager, American Blower Corp., Indianapolis, Ind. The problems involved in installing a system in an existing building were outlined, and the solutions to these problems were presented. Subsequent to this talk, the group was taken on a short tour through the administration building. Mr. Supple described the system while in operation. Both the talk and tour proved thoroughly enjoyable.

Films

At their ladies' night meeting, KANSAS CITY Chapter featured an excellent film on the Hawaiian Islands. • • • A color film shown at a MANITOBA Chapter meeting depicted the largest self-contained polymer manufacturing plant in the world, located in Sarnia, Ontario, and described how synthetic rubber is produced. • • • VIRGINIA Chapter members enjoyed a March of Time film on the production of coal.

Officer Visits

John W. James, Society president and vice president, research, McDonnell & Miller, Inc., Chicago, was guest of honor at a CENTRAL NEW YORK Chapter meeting. President James addressed the members and guests, describing *The Human Body as a Heat Machine.* His talk covered the control of body temperature and its variations, and the effect on the body of noise and color. President James went on to describe the contribution which air conditioning has made to medicine and to the public in general. He named in some detail the various Society contributions to air conditioning. • • • President James was also an honored guest at an ILLINOIS Chapter meeting. He spoke to a gathering of 121 members and their guests on different phases of air conditioning and its future possibilities. A desk set was presented to President James by Illinois Pres. H. G. Gragg as a token of esteem from the chapter. • • • E. R. Queer, second vice president of the Society, and director and professor of engineering research, Pennsylvania State University, University Park, Pa., spoke before the CINCINNATI Chapter on *The ASHAE and Its Future.* Professor Queer described the long-range Society opportunities and mentioned the large metropolitan area potential. • • • For the benefit of MIAMI VALLEY Chapter members, Professor Queer gave an interesting talk dealing with the *Utilization of Underground Caves for Storage Purposes.* Professor Queer traced the use of abandoned limestone mines in Kansas from the early thirties, when they were used for storing food products, up to the present time, when they are being used to store machine tools. He pointed out their strategic value as far as the Army Ordnance was concerned and told of the problems confronted in keeping condensation at a minimum. • • • Second Vice Pres. Queer also spoke briefly before the WASHINGTON, D. C. Chapter. He described the satisfactory working of the regional system.

Journal Section

Personals

EL PASO Chapter elected J. Otis LeBeau, Jr., as member and M. D. Goodwin as alternate member, Chapters Regional Committee. • • • S. R. Lewis, recently elected a Fellow Member of the Society, was presented to the ILLINOIS Chapter by Pres. H. G. Gragg. • • • Several appointments were announced by L. R. Gorrell, president, NORTHERN PIEDMONT Chapter. C. C. Donovan, Harry Hoffman, J. M. Pleasants, G. B. Rottman and P. O. Stahl will serve as a nominating committee, and C. A. Cofer, as member, and C. E. Amick, alternate, Chapters Regional Committee. • • • R. M. Toucey, president, PITTSBURGH Chapter, regretfully announced that Richard Matheis, editor, and Stanley Stake, a member of the board of governors and program chairman, were leaving. A. F. Nass, Jr., was appointed to fill Mr. Stake's dual role. • • • R. A. Sarro graciously accepted a past president's pin presented to him by V. W. Thornburg, president, SACRAMENTO VALLEY Chapter. • • • A slate of 1957 officers was unanimously elected by the SOUTHERN PIEDMONT Chapter. The new slate includes G. C. Garrett, president; J. R. Clark, vice president; N. W. McGuire, Jr., secretary; E. D. Streng, treasurer; and G. N. Payne, Jr., A. W. Bainbridge and J. A. Rice, board of governors. • • • UNIVERSITY OF TORONTO Student Branch unanimously elected J. F. Rea as president and A. J. Holmes as secretary.

CANDIDATES FOR MEMBERSHIP

Listed here are the names of 111 men who are candidates for membership or advancement in membership grade.

Members are requested to assume their full share of responsibility of receiving these candidates into membership by advising the Executive Secretary before February 28, 1957, of any whose eligibility for membership is questioned. Unless such objection is made these candidates will be voted upon by the Council.

Note: **Advancement* †*Reinstatement*

California (*Region* 4)

BARSTOW, C. K., Cons. Mech. Engr., Los Angeles.

BELOTELKIN, K. T., Cons. Engr., K. T. Belotelkin & Assoc., San Francisco.

CARLIN, A. D., Field Engr., Pacific Scientific Co., Bell Gardens.

FRIESEN, H. R., Sales Engr., G. J. Yamas Co., Inc., San Francisco.

GRUNDFOR, H. H., Br. Sales Mgr., Barber-Colman Co., Pasadena.

HARDEMAN, C. S., Pres., C. S. Hardeman, Inc., San Francisco.

HAM, C. F., Htg. Dept. Mgr., Crane Co., San Francisco.

JAMESON, R. W., Staff Plant Engr., Hughes Aircraft Co., Culver City.

MOORE, J. R., Design Engr., J. H. Pomeroy Engineering Co., Los Angeles.

WALKER, G. H., Sales Engr., York Corp., San Francisco.

Connecticut (*Region* 1)

BAADE, P. K., Dvlpt. Engr., Anemostat Corporation of America, Hartford.

MURRAY, G. A., Asst. Div. Engr., The American Brass Co., Waterbury.

SAVAGE, H. D., JR., Vice-Pres., The George Ellis Co. of Hartford, Inc., Hartford.

Delaware (*Region* 1)

TULEY, C. O., Sr. Power Engr., E. I. duPont de Nemours & Co., Inc., Wilmington.

District of Columbia (*Region* 5)

LAFORET, L. F., Dvlpt. Engr., Bituminous Coal Institute (*National Coal Association*), Washington.

Illinois (*Region* 2)

CAGNEY, R. E., Htg. & Cooling Specialist, American Radiator & Standard Sanitary Corp., Chicago.

DEAN, C. E., Sales., Owens-Corning Fiberglas, Chicago.

MARTIN, W. J., Asst. Chief Engr. & Mgr., Contracting Div., American Foundry & Furnace Co., Bloomington.

THORNTON, L. D., Asst. Htg. Mgr., May Co., Galesburg.

VESPASIAN, C. J., Owner, C. J. Vespasian Co., Peoria.

Journal Section

Wilson, L. A., Mgr. of Htg. Div., May Co., Moline.

Indiana (*Region* 2)

Carlson, A. G., Field Engr., American Blower Corp., Indianapolis.

Power, J. D.*, Mech. Cons., Yeager Architects, Inc., Terre Haute.

Iowa (*Region* 3)

Bonnell, J. A., Mgr., Colonial Furnace Co., Ft. Dodge.

Marion, F. M., Sales Engr., The Trane Co., Des Moines.

Merrill, M. G., Jr., Sales Engr., Westinghouse Electric Corp., Sturtevant Div., Des Moines.

Kansas (*Region* 3)

Wagner, C. J., Estimator-Engr., Pray Bros., Wichita.

Louisiana (*Region* 6)

Bush, J. L., Engr. & Mgr., C & S Air Conditioning Co., Inc., Shreveport.

Futch, O. J., Elec. Engr., Barksdale Air Force Base.

Maryland (*Region* 5)

Dischinger, H. R., Pres., Better Air Products Co., Baltimore.

Snyder, Milton, Partner, Wylie Plumbing & Heating Co., Baltimore.

Massachusetts (*Region* 1)

McKay, E. A., Vice-Pres., McKay Fuel Co., Inc., Somerville.

Michigan (*Region* 2)

Jepson, G. L., Mech. Design Engr., The Upjohn Co., Kalamazoo.

Stender, E. R., Mech. Engr., Lewis J. Saruis, Archt., Battle Creek.

Minnesota (*Region* 3)

Gausman, G. F.*, First Vice-Pres., Gausman & Moore Inc., St. Paul.

Missouri (*Region* 3)

Gray, L. D., Steam Distribution Engr., Union Electric Co., St. Louis.

Hellwig, F. J., Engr.-Draftsman, Ferris & Hamig, St. Louis.

New Hampshire (*Region* 1)

Rogers, W. E., Plant Engr., Joy Manufacturing Co., Claremont.

New Mexico (*Region* 6)

Brazier, E. L., Jr.*, Staff Member, Los Alamos Scientific Laboratory, University of California, Los Alamos.

New York (*Region* 1)

Greenberg, Alfred*, Sr. Proj. Engr., Fred S. Dubin Associates, New York.

Leveridge, R. H.*, Sales Engr., Carrier Corporation, New York.

Meyer, H. C., III, Partner, Meyer, Strong & Jones, New York.

Milligan, C. W., Sales Engr., The Trane Co., Buffalo.

Palombi, L. M., Sales Engr., Johnson Service Co., Syracuse.

Schatkun, Philip*, Squad Leader, Tumarkin, Morgan & Emerman, New York.

Standeven, W. E., Partner, Beman & Candee, Cons. Engrs., Buffalo.

Valerio, E. L., Appl. Engr., Carrier Corporation, Syracuse.

Vick, B. J., Sr. Designer, Devenco, Inc., New York.

Whitaker, H. E., Jr., Franchise Holder, The Trane Co., Buffalo.

Ohio (*Region* 2)

Ahart, J. R.†, Cons. Engr., Dayton.

Art, E. W.†, Chief Engr., The Fred D. Pfening Co., Columbus.

Erausquin, R. V., Engr., Libbey-Owens Ford Glass Co., Toledo.

Gilkey, H. T.*, Technical Secy. of Research, *National Warm Air Heating and Air Conditioning Association*, Cleveland.

Roberts, R. E.*, Sales Engr., Carrier Corporation, Cleveland.

Oklahoma (*Region* 6)

Carter, L. H., Jr.*, Partner, Engr., Comfort, Inc., Oklahoma City.

Hantla, A. R., Vice-Pres., The Carl Moore Co., Tulsa.

Henderson, J. R., Jr., Sales Engr., J. R Henderson Co., Oklahoma City.

Mullins, W. L., Sales Engr., The Trane Co., Oklahoma City.

Scheirman, D. M., Mech. Engr., Sorey, Hill & Sorey, Oklahoma City.

Oregon (*Region* 4)

Johnson, E. W., Repr., Consolidated Supply Co., Portland.

Matheson, J. S.*, Sales Engr. & Estimator, Campbell-Norquist & Co., Portland.

Schroeder, R. L.*, Br. Mgr., Johnson Service Co., Portland.

Pennsylvania (*Region* 1)

Buckley, N. A.*, Proj. Engr., Scaife Co., Oakmont.

Hall, A. J., Jr., Sales, H. B. Smith Co., Inc., Philadelphia.

Smith, L. C.*, Dir. & Sales Engr., Russell F. Clark Co. (Inc.), Pittsburgh.

Texas (*Region* 6)

Baker, G. M., Owner, Cons. Mech. Engr., San Antonio.

Buckley, J. B.*, Assoc., I. A. Naman & Associates, Houston.

Chatman, J. G., Vice-Pres., J. P. Ashcraft Co., Inc., Ft. Worth.

Cunningham, H. E., Dist. Mgr., Joiner-Meade-Capers, Inc., Ft. Worth.

Fink, K. C.*, Asst. Dept. Head, A-C. & Plbg. Dept., Brown & Root, Inc., Houston.

Higgins, J. D., Sr., Owner, J. D. Higgins Co., Ft. Worth.

Hodge, E. C., Mech. Engr., U. S. Corps of Engineers, Ft. Worth.

Hulsey, B. B., Design Engr., Decker & Roberts, Ft. Worth.

Inglis, T. N., Jr.*, Vice Pres., L. S. Pawkett & Co., Corpus Christi.

Kaastad, M. N., Mgr. of Insulation Dept., E. O. Wood Co., Ft. Worth.

Marshall, S. D., Partner, Marshall-O'Brien Associates, Dallas.

Newby, C. H., Sales Engr., Sterling & Newby, Dallas.

Piedlau, E. J., Sales Engrg., Jahns Supply Co., Ft. Worth.

Punchard, M. A., Pres., Keetch Metal Works, Ft. Worth.

Roberts, E. A., Partner, Decker & Roberts, Ft. Worth.

Sacra, J. R., Chief Estimator & Engr., C. Wallace Plumbing Co., Houston.

Schwartz, Paul, Head of Mech. Sec., U. S. Corps of Engineers, Ft. Worth.

Smith, G. F., Estimator, Decker & Roberts, Ft. Worth.

Threadgill, J. T., Pres. & Gen. Mgr., Koldaire Supply Co., Inc., Ft. Worth.

Utah (*Region* 4)

Petersen, L. E., Sales Engr., A. A. Maycock Co., Salt Lake City.

Washington (*Region* 4)

Emory, R. D., Engr., Bouillon & Griffith, Seattle.

Larson, W. H., Sales Engr., R. E. Chase & Co., Tacoma.

Liniger, R. H.*, Owner, R. H. Liniger Co., Seattle.

Miskimen, C. W., Jr., Sr. Engr., Bouillon & Griffith, Seattle.

Wisconsin (*Region* 2)

Beseke, K. L.*, Partner, Holland & Beseke, Milwaukee.

Papi, A. D., Mgr. of Htg. Dept., Crane Co., Milwaukee.

Wendt, W. R., Jr.*, Assoc., Holland & Beseke, Milwaukee.

Canada (*Region* 7)

Barrett, W. F., Estimator, S. E. Gage Co., Ltd., Winnipeg, Man.

Bean, J. M., Mgr., Boiler Div., H. F. Clarke (B.C.) Ltd., Vancouver, B. C.

Brock, H. D., Sales Engr., Anthes-Imperial Co., Ltd., Toronto, Ont.

Gibson, R. V., Sales Repr., Francis Hankin & Co., Ltd., Toronto, Ont.

Glumac, D. M., Jr. Mech. Engr., Karel Rybka & Assoc., Toronto, Ont.

Henderson, J. D., Design Engr., Siemens Engineering, Edmonton, Alta.

Kimberley, D. E., Secy.-Treas., Skinner-Atkins, Ltd., Vancouver, B. C.

La Berge, C. H., Chief Operator, Cite Universitaire, Laval, Que.

Panar, David†, Owner-Mgr., Industrial Engineering Consultants, Calgary, Alta.

Poulin, Andre, Htg. & Plbg. Technician, Saillant, Inc., Quebec, Que.

Randall, V. C., Mech. Engr., Dept. of Public Works, Ottawa, Ont.

Rootham, W. L.*, Johnson Temperature Regulating Co. of Canada, Toronto, Ont.

Belgium

Mechelynck, A. L.*, Asst. Tech. Mgr., Ideal Standard, Vilvorde.

England

Overton, E. B.*, Tech. & Sales Dir., Weatherfoil Heating Systems, Ltd., London.

France

Koerner, L. G., Constr. Engr., Lublin McCaughy & Assocs., Paris.

Iran

Dorosti, E. B., Pres., The General Mechanic Co., Tehran.

Southern Rhodesia

Johnstone, F. H., Mgr., Guthrie & Co. (Rhodesia) (Pvt.) Ltd., Salisbury.

Spain

Aspiazu, Alberto, Indus. Engr., Frimotor S.A.E., Bilbao.

Switzerland

Kummer, A. E., Mgr., Sulzer Brothers, Ltd., Bern.

1957 NUCLEAR CONGRESS IN PHILADELPHIA

Peacetime uses of atomic energy will be the topic of the 1957 Nuclear Congress, scheduled for March 11-15 at Philadelphia's Convention Hall, under the coordination of *Engineers Joint Council*. ASHAE is one of the sponsors of the Congress. The session will bring together leaders in science, engineering, industry, government, education, agriculture and other fields. Attendance is expected to exceed 3000.

The International Atomic Exposition expects more than 18,000 interested observers at its displays in Convention Hall.

At the Nuclear Engineering and Science Congress will be 130 technical papers dealing with various phases of nuclear operations from mining to the disposal of radioactive waste.

All members of the Society are invited to attend the Congress, and those intending to do so may communicate with Headquarters for further information.

FOX HEADS ONTARIO ENGINEERS

John H. Fox, member of Council and regional director for region 7, who is general sales manager, Honeywell Controls, Ltd., Toronto, Ontario, has been honored by election as president of the *Association of Professional Engineers of Ontario, Canada.*

Mr. Fox, who for many years has been active in Society affairs, makes his home in Toronto.

The honor and importance which can be attached to this position can be judged to some extent by noting that this association is said to be the largest of its kind in all of Canada. It is the licensing body for professional engineers in Ontario.

VINTHER NOMINATED FOR COUNCIL

P. N. Vinther
Dallas, Tex.

In accordance with the By-Laws, the Nominating Committee has nominated P. N. Vinther, partner, Zumwalt and Vinther, Dallas, Tex., as nominee for a three-year term on Council. This action is taken as a result of the untimely death of R. S. Dill on January 17.

Mr. Vinther, a long-time Society member, has been associated with his present firm since 1937, and active in this field practically continuously since being graduated from Texas A & M College.

Mr. Vinther has been especially interested in the affairs of the North Texas Chapter in which group he has held all the chapter offices and served on the Board of Governors.

A mail ballot incorporating Mr. Vinther's name has been sent to all voting members of the Society.

CONFERENCE ON INDUSTRIAL VENTILATION

The Sixth Annual Conference on Industrial Ventilation at Michigan State University is programmed for February 18-21. A staff of 19 specialists has been organized to conduct the services and the staff includes a number of Society members: C. H. Pesterfield, East Lansing, Mich.; F. N. Calhoon, Ann Arbor, Mich.; E. A. Carsey, Cincinnati, Ohio; J. R. Kayse, Louisville, Ky.

NEW GUIDE COMMITTEE MEETS

The newly appointed Guide Committee met at the Research Laboratory in Cleveland on December 12 and formulated plans for the 1958 edition. The plan of having the Guide Committee start its work in the late fall was initiated last year. Technical Secretary Carl H. Flink was present at the Meeting. Members of the new Guide Committee are M. W. Keyes, Chairman; H. W. Alyea, W. P. Chapman, R. C. Chewning, J. R. Duncan, R. A. Gonzalez, N. B. Hutcheon, R. L. Maher, D. W. Nelson.

OBITUARIES

IN MEMORIAM

Charles-Edward Amory Winslow

1877-1957

Charles-Edward Amory Winslow, 79, pioneering public health expert who was president of the Society in 1945, died on January 9, at the Woodruff Center, New Haven, Conn., following a long illness. Dr Winslow, who was the first chairman of the Department of Public Health of the Yale University School of Medicine, retired as professor-emeritus in 1945 after 30 years at the university.

The cause of public health was advanced by Dr. Winslow through research, teaching, writing, lecturing and participation in international advisory groups. Even after his retirement, he carried on an active program, including work for the United Nations World Health Organization. He was editor of the *American Journal of Public Health* since 1944, and author or co-author of several volumes, including *Temperature and Human Life*, 1949; *Cost of Sickness and the Price of Health*, 1952; and *Man and Epidemics*, 1953.

Dr. Winslow was born on February 4, 1877 in Boston, Mass., and attended Massachusetts Institute of Technology, where he received his B.S. in 1898 and M.S. the year following. There he studied under the eminent biologist, William T. Sedgwick. His first interest was bacteriology.

His teaching career began in 1900 at M.I.T., where he served as assistant and instructor in sanitary bacteriology, and later as assistant professor of sanitary biology as well as biologist in charge of the Sanitary Research Laboratory. After a one-term interim at the University of Chicago, Dr. Winslow was named an associate professor at the College of the City of New York in 1910. At this time he became curator of public health at New York's American Museum of Natural History, a post which he held along with his other duties for 12 years. Along with D. D. Kimball and others, he was appointed to The New York State Commission on Ventilation in 1913. He also entered government service as director of the Division of Public Health Education of the New York State Department of Health, 1914-15.

It was in 1915 that Yale appointed Dr. Winslow as the Anna M. R. Lauder professor of public health. In later years, he assumed the directorship of the university's John B. Pierce Laboratory of Hygiene, where he studied the physiology of air conditioning. During World War II he engaged in basic research for the Army on the effects of heat and cold.

Dr. Winslow's international reputation was fostered by his work as a member of the American Red Cross

Mission to Russia in 1917, and as general medical director of the League of Red Cross Societies at Geneva, 1921. Later he served for 4 years as an expert assessor for the Public Health Section of the League of Nations. This was a forerunner of his position as consultant for the World Health Organization, which honored him as recipient of the Leon Bernard Medal at Geneva in 1952. Dr. Winslow had helped Professor Bernard, for whom the award is named, to organize the health section of the League of Nations.

Widely honored, Dr. Winslow referred to his receipt of the Society's F. Paul Anderson Medal in 1949 as *one of the great satisfactions of my life.* After he had joined the Society in 1932, he immediately assumed an active role, as member and chairman of numerous technical advisory committees. He became a member of the Committee on Research in 1936, served on its executive committee for 3 years, as its technical adviser in 1939, and vice chairman, 1940-42. His election to the presidency in 1945 was preceded by service as a member of Council and as second and first vice president. He was honored by Life Membership in 1948.

Many technical papers, the product of Dr. Winslow's research on the relation of atmospheric conditions to human health and comfort, appear in the Society's TRANSACTIONS. He was also a frequent contributor to medical and health journals and other scientific publications. Beginning in 1916 he was editor of the *Journal of Bacteriology* until 1944, when he became editor of the *American Journal of Public Health.*

Dr. Winslow, who was named director of the division of public health education of the New York State Department of Health in 1941, was cited by the *American Public Health Association* for his assistance to *the State of New York in the development of what has become an outstanding example of public health administration,* when the *APHA* presented him with its Special Lasker Award in 1952. He had also received the association's Sedgwick Memorial Medal 10 years before, and served as its president.

New York University presented Dr. Winslow with the honorary degree of Doctor of Public Health in 1918, and the University of California selected him as its Rosenberg lecturer, 1941. The Rockefeller Foundation named him as a member of the board of scientific directors of the International Health Division, 1929-30. Dr. Winslow, who was senior sanitarian of the United States Public Health Service (reserve), also served as a member of the Advisory Council of the National Institutes of Health. He was instrumental in founding the Yale School of Nursing and was chairman of the Committee on the Costs of Medical Care.

In addition to being a fellow of the *American Public Health Association* and the *American Association for the Advancement of Science,* Dr. Winslow had served as chairman of the latter association and president of the *National Association of Housing Officials,* the *Society of American Bacteriologists* and *Connecticut Society for Mental Hygiene.* He was a member of the *Society of Experimental Biology and Medicine, American Society of Naturalists, New England Water Works Association,* and Connecticut Academy of Arts and Sciences.

Surviving are his wife, Anne Rogers Winslow, and a daughter, Anne.

ROBERT C. CLARKSON, JR.
Philadelphia, Pa.

Robert C. Clarkson, Jr., consulting engineer, Philadelphia, Pa., died recently at the age of 64. A resident of Haverford, Pa., he was a member of the Philadelphia Chapter.

Mr. Clarkson was born in Philadelphia, and studied at the University of Pennsylvania, receiving his B.S. in M.E. in 1915. While still in school, he gained experience in engineering work with his father, a consulting engineer and charter member of the Philadelphia Chapter.

The younger Clarkson had considerably varied experience in the field after graduation. Among his positions were those of chief mechanical inspector for the Philadelphia Board of Education on the PWA building program, and consulting engineer for projects at the U.S. Navy Yard, Philadelphia. During World War II he worked as a mechanical and electrical engineer at Frankford Arsenal, Philadelphia. In later years, he succeeded his father in the consulting engineering venture.

R. C. Clarkson, Jr., is survived by his widow and a sister, Mrs. Parker Webb.

VICTOR J. CUCCI
New York, N.Y.

Victor J. Cucci, New York consulting engineer, died on December 4 at 69 years of age. He was a Life Member of the Society and a member of the New York Chapter.

John R. Allen Memorial Library

The ASHAE Committee on Research gratefully acknowledges the following gifts to the John R. Allen Memorial Library, which is maintained at the Society's Research Laboratory, 7218 Euclid Ave., Cleveland 3, Ohio.

Aluminum in Modern Architecture, Vol. 1, by John Peter.
Gift of the Reynolds Metals Co.

Principles of Air Distribution, by R. D. Tutt.
Gift of Mr. Tutt.

Proceedings of the National District Heating Association, 1955. Gift of the Association.

Year Book of the Heating and Ventilating Industry, 1956.
Gift of the Industry.

The presentation of textbooks and pamphlets in the field of heating, ventilating and air conditioning and allied fields, by authors and others, will be welcomed by this library. Suitable book plates carry the name of the donor and date of the gift.

Mr. Cucci secured copyright on a ship ventilating system and an electric porthole ventilator in the early 1940's when he was in charge of the heating and ventilating department in the offices of George G. Sharp, marine architect. At different times, Mr. Cucci maintained a consulting office either on his own or in partnership, as Kimball and Cucci, and as Cucci and Brown, Inc.

He was a member of *ASME, New York State Society of Professional Engineers, New York Society of Architects,* and *Society of American Military Engineers.*

His survivors are his wife; two daughters, Mrs. Joseph Giglio and Mrs. Marian Archdeacon; and a son, Victor J. Cucci, Jr.

CLYDE W. DAVIS
Huntington, W. Va.

The Society has learned of the recent death of Clyde W. Davis, president, C. W. Davis & Son, Inc., Huntington, W. Va. He had been a plumbing and heating contractor since 1931.

Mr. Davis, a native of Huntington, received has A.B. from Marietta College Academy. For 18 years previous to opening his own business, he acted as secretary-treasurer-manager of Bockway Plumbing & Supply Co.

His wife, residing at their home in Huntington, survives.

ORVILLE D. MARSHALL
Grand Rapids, Mich.

Orville D. Marshall, 59, partner, Marshall & Wells Co., Grand Rapids, Mich., died at Butterworth Hospital on December 12, following a lengthy illness. Mr. Marshall was the first president of the Western Michigan Chapter, formed in 1931, and was chairman of the Special Events Committee for the Society's 1944 Semi-Annual Meeting held in Grand Rapids.

The O. D. Marshall Co. was founded by Mr. Marshall in 1932. When Robert L. Wells became a partner in 1947, the name of the firm was changed to Marshall & Wells Co.

A native of Chicago, Mr. Marshall attended preliminary schools there and the University of Chicago. He was associated with the Chicago office of the U.S. Weather Bureau, and during World War I he served as meteorologist in charge of the Great Lakes Naval Training Station weather observatory. Previous to opening his own business, he did sales work for American Radiator Co., Indianapolis, Ind., and Illinois Engineering Co., Scranton, Pa., Chicago and Grand Rapids.

Besides his active participation in ASHAE affairs, Mr. Marshall was a member of Grand Rapids Rotary and Peninsular clubs. He was a member of Fountain Street Baptist Church.

Survivors include his wife, Mary; a daughter, Mrs. William Pecht, Indianapolis; and a grandson.

MARTIN SCHAAR
Milwaukee, Wis.

Martin Schaar, 53, of the Wisconsin Chapter, died at Deaconess Hospital, Milwaukee, on November 20, 1956 after a long illness. He had been owner and manager of the Wisconsin Furnace Co. since 1933.

Mr. Schaar attended trade school in Germany, his birthplace. He had 10 years experience as a sheet metal mechanic and in warm air heating installation previous to opening his own business.

An active man in his community, Mr. Schaar held membership in the Allied Construction Industry, *Milwaukee Builders Association, NWAH & ACA,* Freie Gemeinde, and the Milwaukee Athletic Club. He was a past president of the Sheet Metal Contractors Association of Milwaukee and an associate member of the Milwaukee Board of Realtors.

Survivors are his wife, Frieda; a son, Richard; and his mother, Mrs. Anna Schaar.

AMERICAN SOCIETY OF HEATING AND AIR-CONDITIONING ENGINEERS

(For most recent listings of Society committee personnel see Frontispiece, JOURNAL SECTION)

Presidents and Secretaries of Society Chapters and Branches

The Society has chartered 66 Chapters, 6 Student Branches and 1 Special Branch. These organizations elect their own officers and governing boards. Following is a list giving the name and address of the president and secretary of each of these groups.

Date indicates year organized; an address and no city shown signifies same city as headquarters; numeral in parentheses indicates zone.

ARIZONA

Arizona: 1953. Hdqrs., Phoenix. Meets, 1st Mon. PRES, J. B. Hoaglund, 1923 W. Osborn Rd. SECY, F. W. Gabbard, 111 East 14th St., Tempe.

ARKANSAS

Arkansas: 1952. Hdqrs., Little Rock. Meets, 3rd Tues. PRES, J. W. Thompson, 900 Center St. SECY, K. A. Pettit, 904 Wallace Bldg.

CALIFORNIA

Golden Gate: 1937. Hdqrs., San Francisco. Meets, 1st Thurs. PRES, F. K. Crouch, 906 Cerrito St., Albany (6). SECY, J. B. Smith, 1129 Folsom St.

Sacramento Valley: 1952. Hdqrs., Sacramento. Meets, 1st Wed. PRES, V. W. Thornburg, 2470 27th Ave. SECY, S. W. Doolittle, 581 Swanston Dr.

Southern California: 1930. Hdqrs., Los Angeles. Meets, 1st Tues. PRES, H. F. Ulovec, 3886 Olympiad Dr. (43). SECY, A. Z. Levine, 239 S. Oxford Ave. (4).

COLORADO

Rocky Mountain: 1944. Hdqrs., Denver. Meets, 1st Wed. PRES, A. S. Widdowfield, 1925 Blake St. (2). SECY, R. T. Beck, 1304 Cherokee St. (4).

CONNECTICUT

Connecticut: 1940. Hdqrs., New Haven. Meets, 3rd Thurs. PRES, Walter Heywood, 1007 Farmington Ave., West Hartford. SECY, R. B. Cahoon, 1326 Whalley Ave. (15).

DISTRICT OF COLUMBIA

Washington, D.C.: 1935. Hdqrs., Washington, D.C. Meets, 2nd Wed. PRES, J. H. Broome, 4926 Wisconsin Ave. (16). SECY, J. W. Morgan, 2117 M Street, N.W.

GEORGIA

Atlanta: 1937. Hdqrs., Atlanta. Meets, 2nd Mon. PRES, F. W. Bull, 1205 Spring St., N.W. SECY, J. S. Edgar, 2015 Peachtree Rd., N.W.

ILLINOIS

Illinois: 1906. Hdqrs., Chicago. Meets, 2nd Mon. PRES, H. G. Gragg, 228 N. LaSalle St. (1). SECY, Herbert Kreisman, 117 N. Desplaines St. (6).

Illinois-Iowa: 1956. Hdqrs., Moline. PRES, R. L. Graham, 301 Safety Bldg., Rock Island. SECY, D. H. Ninow, 1824 3rd Ave.

INDIANA

Indiana: 1943. Hdqrs., Indianapolis. Meets, 4th Tues. PRES, A. O. Roche, Jr., 3950 Broadway (5). SECY, W. F. Currise, 619 Architects & Builders Bldg. (4).

IOWA

Iowa: 1940. Hdqrs., Des Moines. Meets, 2nd Tues. PRES, D. E. Schroeder, 2717 Cambridge. SECY, R. T. Howard, Jr., 220 Davidson Bldg.

KANSAS

Kansas: 1951. Hdqrs., Wichita. Meets, Tues. after 1st Mon. PRES, H. M. Skalla, 2639 Sennett (16). SECY, J. C. Mikesell, 5426 E. Pine (6).

KENTUCKY

Bluegrass: 1954. Hdqrs., Louisville. Meets, 2nd Mon. PRES, W. J. Killian, 215 Central Ave. (8). SECY, A. E. Handmaker, 500 Bergman Ave. (8).

LOUISIANA

Baton Rouge: 1955. Hdqrs., Baton Rouge. Meets, 3rd Wed. PRES, J. F. Naylor, Jr., 5363 Greenwell Springs Rd., P.O. Box 4688 Audubon Station. SECY, W. J. Le Blanc, 3185 Government St.

Delta: 1939. Hdqrs., New Orleans. Meets, 3rd Tues. PRES, H. N. Stall, 840 Baronne St. (12). SECY, O. F. Schully, 4052 Thalia St.

Shreveport: 1948. Hdqrs., Shreveport. Meets, 3rd Thurs. PRES, H. E. Scott, 1020 Market St., P.O. Box 1821. SECY, L. E. Kneipp, P.O. Box 1382.

MARYLAND

Baltimore: 1949. Hdqrs., Baltimore. Meets, 3rd Wed. PRES, W. G. Robertson, Jr., 2315 St. Paul St. (18). SECY, C. E. McCaffray, Huntingdon Ave. at 26th (11).

MASSACHUSETTS

Massachusetts: 1912. Hdqrs., Boston. Meets, 3rd Tues. PRES, W. G. Martin, Jr., 64 Moulton St., Cambridge (38). SECY, F. J. Butler, 129 Malden St. (18).

Western Massachusetts: 1955. Hdqrs., Springfield. PRES, J. E. Reed, 57 Main St., Westfield. SECY, C. R. Munn, 29 Logan St.

MICHIGAN

Michigan: 1916. Hdqrs., Detroit. Meets, 1st Mon. after 10th of month. PRES, J. N. Livermore, 2000 Second Ave. (26). SECY, J. B. Olivieri, 37294 Ilene, Mt. Clemens.

Western Michigan: 1931. Hdqrs., Grand Rapids. Meets, 2nd Mon. PRES, F. L. Murray, 482 W. Michigan Ave., Battle Creek. SECY, R. J. Waalkes, 500 E. 8th St., Holland.

MINNESOTA

Minnesota: 1918. Hdqrs., Minneapolis. Meets 1st Mon. PRES, E. T. Erickson, 500 Investors Bldg. (2). SECY, J. H. Jester, 621 E. Hennepin Ave.

MISSISSIPPI

Mississippi: 1953. Hdqrs., Jackson. Meets, 4th Mon. PRES, J. W. Doggett, Jr., 254 Kimbrough Dr. SECY, D. F. Ingram, 408 W. Fortification St.

MISSOURI

Kansas City: 1917. Hdqrs., Kansas City. Meets, 1st Mon. PRES, R. M. Spencer, 1510 Main St. SECY, J. E. Miller, 5830 Outlook, Mission, Kan.

St. Louis: 1918. Hdqrs., St. Louis. Meets, 2nd Tues. PRES, W. P. Norris, 6338 Waterman Ave. (5). SECY, J. J. Blackmore, 4233 Chouteau Ave. (10).

NEBRASKA

Nebraska: 1940. Hdqrs., Omaha. Meets, 2nd Tues. PRES, L. J. Paulsen, 1901 S. 39th St. SECY, E. N. Seiler, 1824 N. 53rd St.

NEW JERSEY

North Jersey: 1952. Hdqrs., Newark. Meets, 2nd Tues. PRES, W. C. Kruse, Jr., 183 N. 13th St. (7). SECY, S. H. Nitzberg, P.O. Box 157, Wood-Ridge.

NEW MEXICO

New Mexico: 1954. Hdqrs., Albuquerque. Meets, 3rd Tues. PRES, C. R. Wherritt, 4138-A Trinity Dr., Los Alamos. SECY, R. G. Merryman, 592 Kiva St., Los Alamos.

NEW YORK

Central New York: 1944. Hdqrs., Syracuse. Meets, 4th Wed. PRES, H. J. Morton, 122 Lincoln Ave. SECY, E. L. Moyer, R. D. 2, Jamesville.

Empire State Capital: 1951. Hdqrs., Albany. Meets, 2nd Wed. PRES, G. G. Davis, 111 S. Church St., Schenectady. SECY, M. E. Waddell, 1623 Central Ave.

New York: 1911. Hdqrs., New York. Meets, 3rd Mon. PRES, J. B. Hewett, 64 Buena Vista Dr., Dobbs Ferry. SECY, Carl H. Flink, 62 Worth St. (13).

Western New York: 1919. Hdqrs., Buffalo. Meets 2nd Mon. PRES, V. N. Harwood, 250 Delaware Ave. (2). SECY, J. F. Bedard, 505 Franklin St.

NORTH CAROLINA

Northern Piedmont: 1952. Hdqrs., Greensboro, Meets, 2nd or 3rd Fri. PRES, L. R. Gorrell, 1412 Chester Rd., Raleigh. SECY, C. E. Amick, 1042 Oakmont Ave.

Southern Piedmont: 1952. Hdqrs., Charlotte. PRES, G. C. Garrett, P. O. Box 3697 (3). SECY, N. W. McGuire, Jr., 1202 Commercial Bank Bldg., Greenville (2).

OHIO

Central Ohio: 1944. Hdqrs., Columbus. Meets, 3rd Mon. PRES, W. A. Schoonover, 2901 N. High St. (2). SECY, R. C. Liebert, 623 N. High St. (11).

Cincinnati: 1932. Hdqrs., Cincinnati. Meets, 1st Tues. PRES, R. G. Anderson, 1758 Elmore St. (23). SECY, C. P. Krantz, 2308 W. 8th St. (4).

Miami Valley: 1950. Hdqrs., Dayton. Meets, 1st Wed. PRES, J. B. Rishel, 397 W. 1st St. (2). SECY, R. B. Walcott, 2340 E. River Rd. (9).

Northern Ohio: 1916. Hdqrs., Cleveland. Meets, 2nd Mon. PRES, H. R. Canoyer, 1900 Superior. SECY, R. D. Wilson, 2142 E. 19th St. (15).

Toledo: 1954. Hdqrs., Toledo. PRES, J. F. Guest, 1815 N. 13th St. SECY, Robert Greenwald, 2525 Portsmouth Ave. (13).

OKLAHOMA

Oklahoma: 1935. Hdqrs., Oklahoma City. Meets, 2nd Mon. PRES, F. R. Denham, 320 Oklahoma Natural Bldg. (2). SECY, W. R. Johnson, 120 E. Main.

Northeastern Oklahoma: 1948. Hdqrs., Tulsa. Meets, 2nd Tues. PRES, H. W. Meinholtz, Box 2261. SECY, H. L. Cauvel, 3342 East 41st St.

OREGON

Oregon: 1939. Hdqrs., Portland. Meets, Thurs. after 1st Tues. PRES, W. R. Norte, 2225 N. E. Broadway (12). SECY, G. G. Van Alst, 947 S. E. Market.

PENNSYLVANIA

Philadelphia: 1916. Hdqrs., Philadelphia. Meets, 2nd Thurs. PRES, C. J. Lubking, 3345 W. Hunting Park Ave. (32). SECY, Ludwig Mack, Germantown Manor.

Pittsburgh: 1919. Hdqrs., Pittsburgh. Meets 3rd Mon. PRES, R. M. Toucey, 223 Fourth Ave. (22). SECY, G. E. Smetak, 1238 Brighton Rd. (23).

SOUTH CAROLINA

South Carolina: 1964. Hdqrs., Columbia. PRES, J. E. McMurray, 1639 Blanding St. SECY, A. L. Blackstone, Jr., 1630 Laurel St.

TENNESSEE

Memphis: 1944. Hdqrs., Memphis. Meets, 3rd Mon. PRES, W. L. Henson, 496 S. Main St. SECY, G. B. Ramsey, Jr., 157 Neil St. (3).

TEXAS

Austin: 1956. Hdqrs., Austin. PRES, B. E. Segall, Jr., 705 N. Lamar. SECY, J. L. Rea, Jr., 300 W. 8th St., P.O. Box 5206.

El Paso: 1956. Hdqrs., El Paso. PRES, J. O. LeBeau, Jr., 1021½ E. Missouri. SECY, J. H. Brooks, 4028 Hamilton St.

North Texas: 1938. Hdqrs., Dallas. Meets, 3rd Mon. PRES, H. G. Gregerson, 4512 Livingston (5). SECY, Ross Zumwalt, 929 Mercantile Securities Bldg. (1).

South Texas: 1938. Hdqrs., Houston. Meets, 3rd Fri. PRES, J. C. Lewis, Box 8188. SECY, E. B. Appling, 4101 San Jacinto St. (4).

Southwest Texas: 1946. Hdqrs., San Antonio. Meets 3rd Tues. PRES, Boone Crisp, Rt. 2, Box 421. SECY, D. T. Kern, 14 Chandler Bldg. (5).

West Texas: 1953. Hdqrs., Lubbock. Meets, 1st Tues. PRES, J. C. Wharton, P. O. Box 1240. SECY, D. G. Halley, 3608 Ave. A.

UTAH

Utah: 1944. Hdqrs., Salt Lake City. Meets, 3rd Thurs. PRES, W. L. Stuewe, 1472 S. State St. (4). SECY, W. C. Leslie, 307 W. 2nd St.

VIRGINIA

Virginia: 1946. Hdqrs., Norfolk. Meets, 3rd Wed. PRES, C. G. Conaway, Jr., 7454 Hank Ave. (5). SECY, D. L. Gusler, 208 Midtown Bldg.

WASHINGTON

Inland Empire: 1950. Hdqrs., Spokane. Meets, 1st Mon. PRES, Max Tonn, 4021 S. Latawah. SECY, R. D. Nevers, E. 124 Augusta, P.O. Box 5026 (21).

Pacific Northwest: 1928. Hdqrs., Seattle. Meets, 2nd Tues. PRES, L. F. Christofferson, 425-1411 Fourth Ave. Bldg. (1). SECY, H. M. Hendrickson, Mech. Engrg. Dept., University of Washington (5).

WISCONSIN

Wisconsin: 1922. Hdqrs., Milwaukee. Meets, 3rd Mon. PRES, H. K. Forfar, 1400 E. Park Pl. (11). SECY, H. W. Snyder, 5520 W. Burleigh (10).

CANADA

British Columbia: 1952. Hdqrs., Vancouver. Meets, 2nd Wed. PRES, D. W. Thomson, 1690 W. Broadway (9). SECY, W. F. Keenan, 54 W. Fifth Ave. (10).

Chapitre de la Ville de Quebec: 1956. Hdqrs. Quebec, P.Q. PRES, Jean Veilleux, 350 E. Charest Blvd. SECY, R. A. Harnois, 604 St. John St., Rm. 203.

Manitoba: 1935. Hdqrs., Winnipeg. Meets, 4th Thurs. PRES, A. H. Millar, 342 Mandeville St. (12). SECY, R. M. Fraser, 1855 Sargent Ave. (12).

Montreal: 1936. Hdqrs., Montreal. Meets, 3rd Mon. PRES, S. R. Plamondon, City Planning Dept., Smoke Control Division, City Hall. SECY, Arthur DeBreyne, 9 St. Denis St., St. Lambert.

Northern Alberta: 1956. Hdqrs., Edmonton. Meets, 3rd Wed. PRES, W. C. Woods, 13908 116 Ave. SECY, E. K. Cumming, 10249 104 St.

Ontario: 1922. Hdqrs., Toronto. Meets, 1st Mon. PRES, C. J. Bootes, 15 Torbarrie Rd., Downsview. SECY, H. R. Roth, Rm. 407, 57 Bloor St., W.

Ottawa Valley: 1952. Hdqrs., Ottawa. Meets 3rd Tues. PRES, D. W. Banton, 360 Richmond Rd. (3). SECY, Jacob Klassen, 454 Slater St. (4).

SPECIAL BRANCH

Switzerland: 1952. Hdqrs., Zurich. PRES, Albert Eigenmann, Seestr. 105 (2). SECY, Hans Kamm, Spitalgasse 30, Bern.

STUDENT BRANCHES

North Carolina State College: 1948. Faculty Adviser: Prof. R. B. Knight, M. E. Dept., Raleigh, N. C.

Oregon State College: 1949. Faculty Adviser: Prof. G. E. Thornburgh, M. E. Dept., Corvallis, Ore.

Purdue University: 1948. Faculty Adviser: Prof. F. B. Morse, M. E. Dept., West Lafayette, Ind.

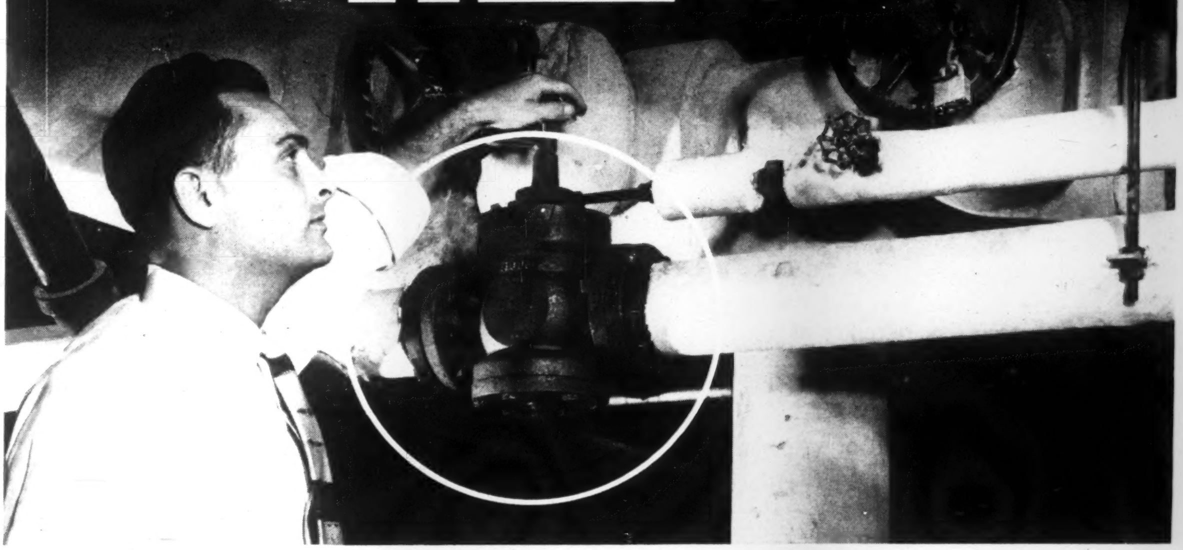
Texas A. & M. College: 1946. Faculty Adviser: Prof. L. S. O'Bannon, M. E. Dept., College Station, Tex.

University of Detroit: 1949. Faculty Adviser: Prof. J. E. Lay, M. E. Dept., Detroit, Mich.

University of Toronto: 1951. Faculty Adviser: Prof. F. G. Ewens, M. E. Dept., Toronto, Ont., Canada.

PROVEN PERFORMANCE

at A. E. STALEY Mfg. Co.

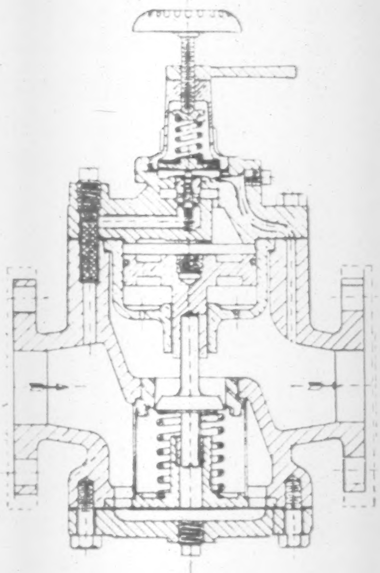


CASH STANDARD Type 44

Pressure Reducing and Regulating Valve for Steam Service

Sudden changes in the requirements for hot water in the employees' shower rooms at the **A. E. Staley** plant, Decatur, Ill., demand full capacity range operation of the regulating valve with precise control of downstream pressure.

In April of 1956, a CASH STANDARD Type 44 Steam Valve was installed in the line supplying steam to the heater. **Gerald Hammond**, instrument engineer at **Staley**, reports: "The CASH STANDARD Type 44 has given exceptionally good service—the kind of service we expect from all CASH STANDARD products. It has required no maintenance since installation eight months ago."



What's your control problem? Use this dependable steam valve.

Built in Pilot and Main Valve Strainers • Internal Pilot-Operated, Piston-Actuated • Single Seat • Highly Sensitive, Responsive to Smallest Changes in Reduced Pressure • Maximum Inlet Pressure 250 PSI @ 400°F. • Delivery Pressure 5-250 PSI • Available with External Sensing Line • Sizes 2", 2½", 3", 4".

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P. O. Box 551, Decatur, Ill.

PRESSURE, HYDRAULIC, TEMPERATURE, PROCESS AND COMBUSTION CONTROLS

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Since 1875

A GREAT LINE

HOT WATER

The 82-year tradition of highest quality is evident in every detail of "Watts great line of heating specialties." In the Watts line you will find the largest and most complete selection of controls for meeting a wide variety of heating boiler requirements.

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A.S.M.E. Rated Pressure Safety Relief Valves

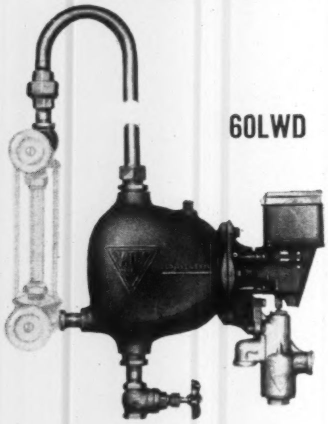
N74
Size ¾″

N174 Series
Sizes
¾″ to
2″ inclusive

Affords complete pressure protection for hot water boilers with a single valve. Available pressure settings 30 to 150 lbs.

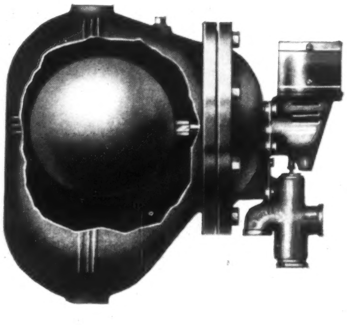
BOILER WATER LEVEL CONTROLS FOR

Boiler Water Feeders



60LWD

76LWD



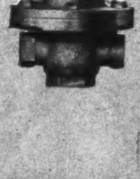
Feeder
cut-off
combinations

SERIES	CONNECTIONS	CAPACITY	STEAM	WATER
60	½″ gauge glass	up to 5,000 sq. ft. rad.	25 lbs.	150 lbs.
76	1″ chamber, ¾″ feed valve	over 5,000 sq. ft. rad.	35 lbs.	150 lbs.
81	1″ chamber, ¾″ feed valve	over 5,000 sq. ft. rad.	35 to 75 lbs.	150 lbs.

OTHER PROTECTIVE & CONTROL DEVICES

36
Vacuum Relief Valve For use on steam coil heaters to prevent a vacuum. Size ¾″

71
Tempering Valve for tankless heaters. Sizes ½″, ¾″, 1″



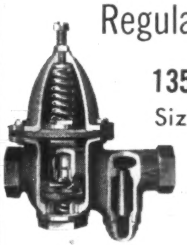
152
Steam Regulator for process. Sizes ½″, ¾″, 1″

127
Steam Regulator for process and dead end service. Sizes ½″ to 3

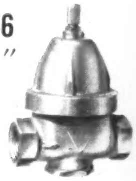
OF HEATING SPECIALTIES

HEATING SPECIALTIES

Feed Water Pressure Regulators



135HW
Sizes ½″, ¾″, 1″

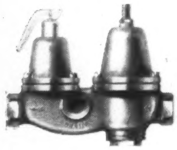


N56
Size ½″

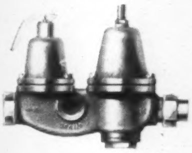
Feeds water to boiler at 10 to 15 lbs.

Dual Controls

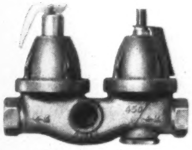
Feeds water to boiler at 12 lbs. — Pressure relief at 30 lbs.



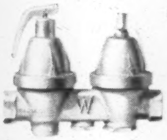
45A
Deluxe construction
Size ½″



45AU
Nos. 45AU or N45OU have sweat copper union applied to inlet end.



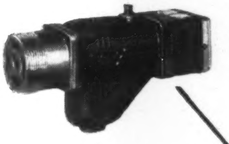
N450
Popular design
Size ½″



Dual Control with built-in check valve
Size ½″

LOW PRESSURE STEAM HEATING BOILERS

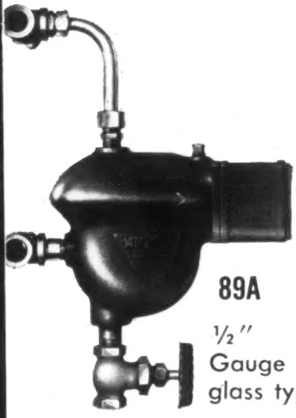
Low Water Cut-Offs



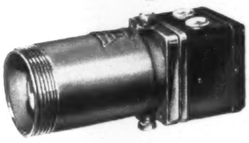
101A
Exclusive 2½″ screw-in type with sediment chamber.

93A
2½″
screw-in type

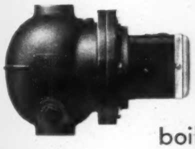
MAXIMUM STEAM PRESSURE 25 lbs.



89A
½″
Gauge glass type



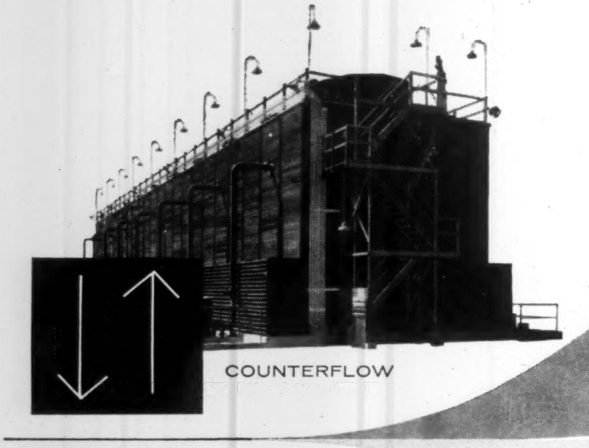
193A
2½″ Screw-in type for use where shallow section and depth of jacket prevent use of No. 93A.



50A
1″ Float chamber connections for use on process boilers and hot water heating boilers. Max. steam press. 50 lbs.

A Great Line of Plumbing and Heating Safety Valves and Controls

WATTS REGULATOR COMPANY
LAWRENCE · MASSACHUSETTS
MANUFACTURERS OF
PLUMBING and HEATING... SAFETY VALVES and CONTROLS



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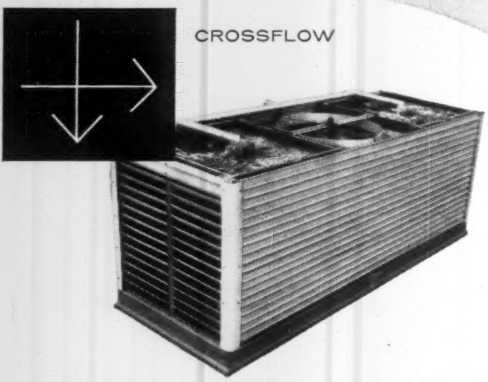

Pritchard
LOLINE®

COOLING TOWERS

WHATEVER YOUR COOLING TOWER REQUIREMENTS... YOU GET MORE FROM PRITCHARD!

Whether you need a large, heavy-duty industrial cooling tower or a smaller LOLINE crossflow tower for industrial processes or air conditioning service, you can look to Pritchard because Pritchard makes both!

Both have many outstanding, exclusive features. (For example, the extremely low silhouette of the LOLINE; the patented design of the fan blade on the industrial towers.) Both offer you guaranteed performance. Both give you more for your cooling tower dollar. Consult with your nearest Pritchard representative (his name is in the classified section of the phone book) or write direct and find out why you always get more from Pritchard.

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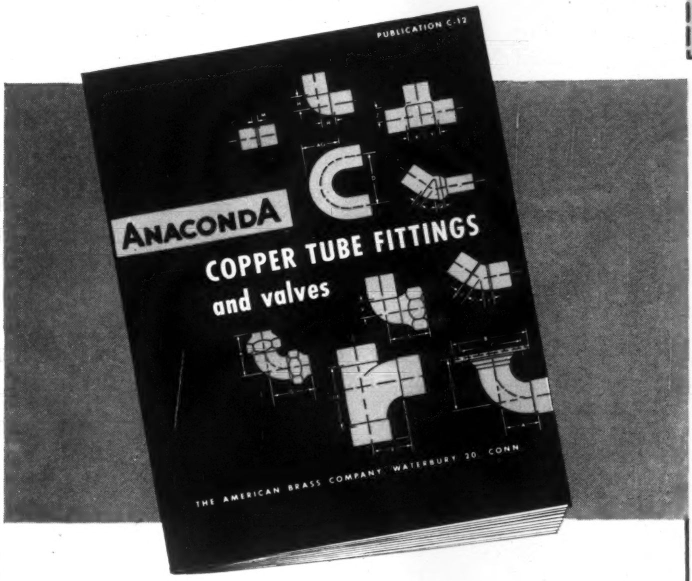

A CATALOG LISTING THE MOST COMPLETE RANGE OF FITTINGS FOR USE WITH COPPER TUBE.

- *Lists all sizes—bag quantity, where applicable*
- *Approximate net weights*
- *Roughing-in dimensions*
- *Suggestions for installation*

The full line of Anaconda Fittings is designed to match Anaconda Tube.

Anaconda Tube is consistently uniform in gage, size and temper. It's easy to work with.

Pick up both at your Anaconda wholesaler's — for fast, easy installations — for copper systems you can put in and forget.

5701

ANACONDA®

COPPER TUBES AND FITTINGS

AVAILABLE THROUGH PLUMBING WHOLESALERS

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COMPANY.....................................
ADDRESS.....................................
CITY....................ZONE....STATE..........

CONTENTS

SECTION 1

Wrought-Copper Solder-Joint Fittings. Nominal sizes ⅛″ through 4″.

SECTION 2

Wrought-Copper Solder-Joint Fittings for Refrigeration and Air Conditioning Use. Actual OD sizes 3/16″ through 4⅛″.

SECTION 3

Cast-Brass Solder-Joint Fittings. Nominal sizes ⅛″ through 12″.

SECTION 4

Cast-Brass Solder-Joint Drainage Fittings. In all standard combinations from 1¼″ through 8″.

SECTION 5

Brass Fittings for Flared Tubes. In all standard combinations, nominal sizes from ⅛″ through 3″.

SECTION 6

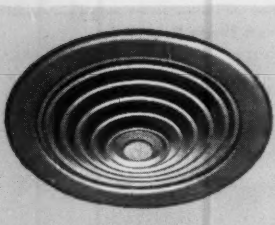
Flanged Fittings. In sizes to meet all standard requirements.

SECTION 7

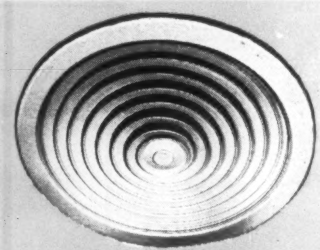
Accessories. Hangers, Flanging and Sizing Tools, Tube Straps.

SECTION 8

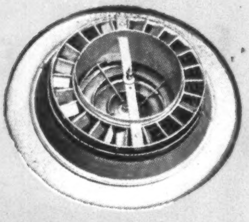
Cast-Brass Valves. Full range of standard sizes and combinations.



TYPE R Circular, adjustable volume, *constant pattern and radius of diffusion.*

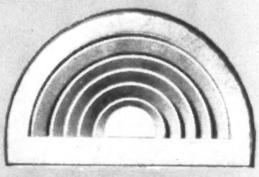


TYPE V Circular, adjustable volume and pattern, for heating and cooling.



TYPE CH Circular, adjustable supply and return, for heating and cooling.

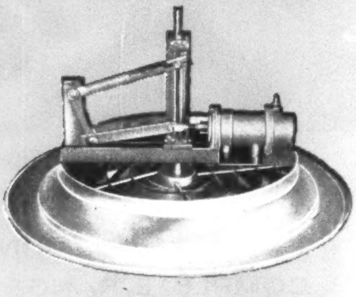
a model for every diffuser need FLEXIFLO



TYPE S Half-round, for side wall or ceiling, for heating or cooling.

- CIRCULAR
- SQUARE
- RECTANGULAR
- ADJUSTABLE
- AUTOMATIC

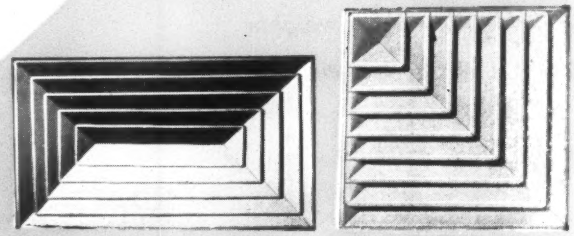
All FLEXIFLO diffusers are styled simply, beautifully . . . finished in baked enamel of any desired color . . . extra features include built-in equalizing deflectors . . . simple, easy installation and removal of diffuser cores with just a "twist of the wrist."



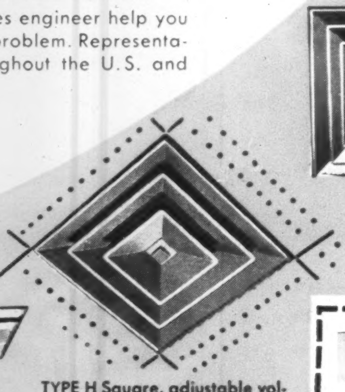
TYPE A Circular, adjustable volume, constant pattern *AUTOMATICALLY CONTROLLED.*

A COMPLETE LINE OF DIFFUSER ACCESSORIES

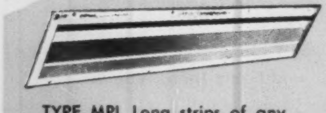
Let a trained FLEXIFLO sales engineer help you solve your air distribution problem. Representatives in major cities throughout the U.S. and Canada.



TYPE MP Rectangular, for one, two, three or four-way diffusion, 16 styles, hundreds of sizes to accommodate any shaped area.



TYPE H Square, adjustable volume, *constant pattern and radius of diffusion.*



TYPE MPL Long strips of any length, for one- or two-way diffusion.

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NEW "LINE-AIR" LONG SLOT DIFFUSER

Supplies thin blanket of uniform, draftless air from long narrow slots over wide continuous area. Provides ideal air distribution under such conditions as large temperature differentials; low mounting heights; low, as well as high, rates of air exchange. See us at Booth 1236, International Heating & Air Conditioning Exposition, Chicago.

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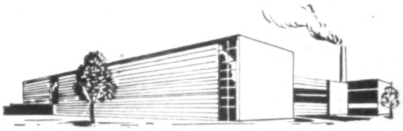
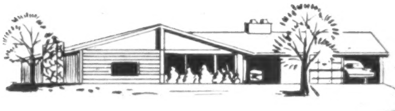


...for residences



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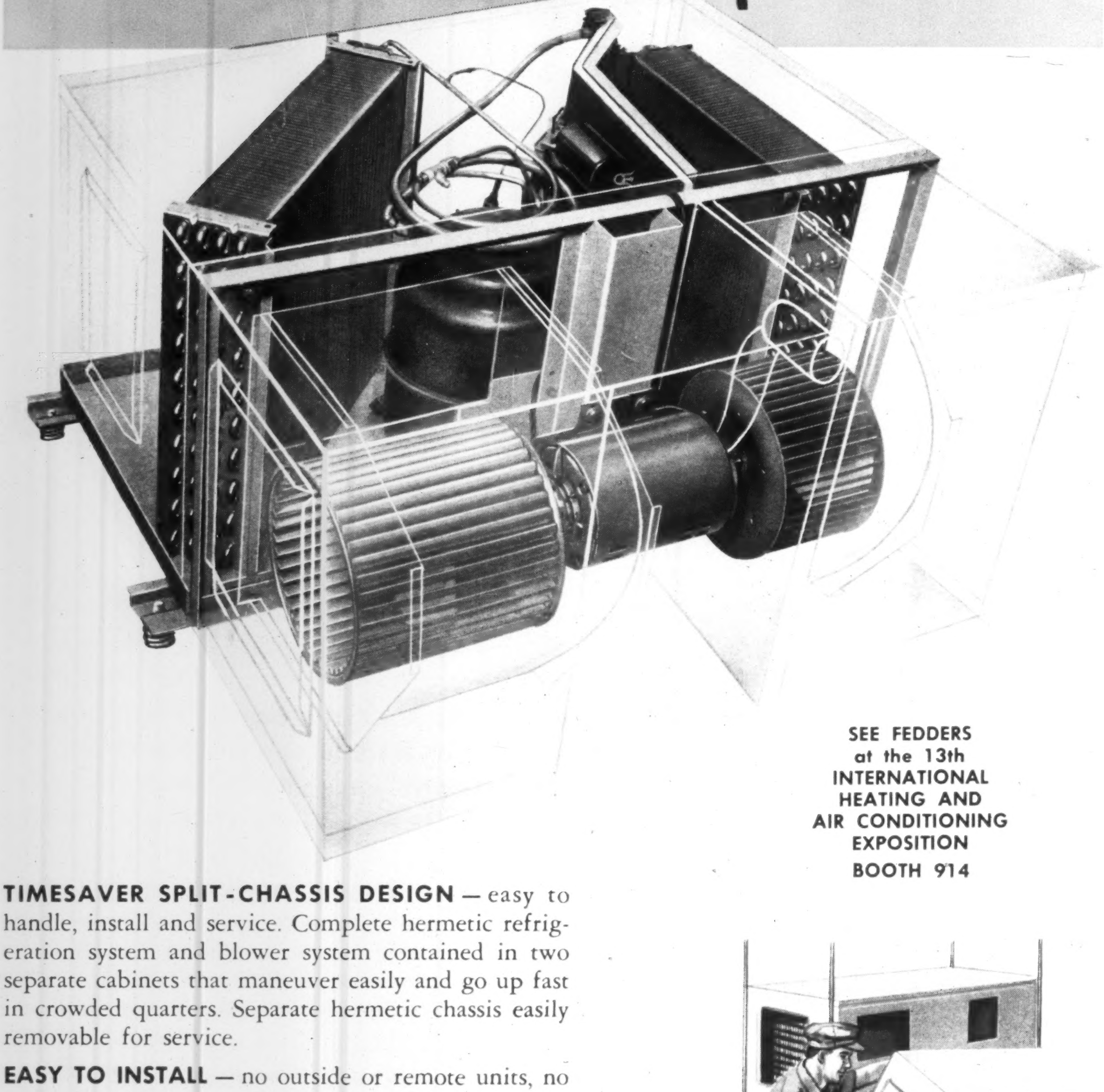

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at the 13th
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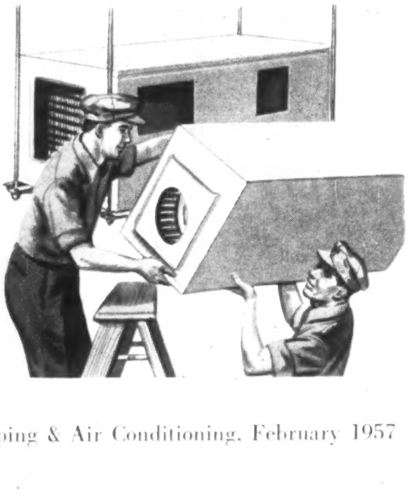
BOOTH 914

TIMESAVER SPLIT-CHASSIS DESIGN — easy to handle, install and service. Complete hermetic refrigeration system and blower system contained in two separate cabinets that maneuver easily and go up fast in crowded quarters. Separate hermetic chassis easily removable for service.

EASY TO INSTALL — no outside or remote units, no costly "on-site" hermetic lines to install. Waterless, no cooling towers, no pumps.

INSTALLS ANYWHERE — in attic, basement or any convenient interior location where duct work is minimized, as well as on exterior walls. Only Fedders Adaptomatic with pressurized condenser air permits low cost applications, eliminating cold air ducts.



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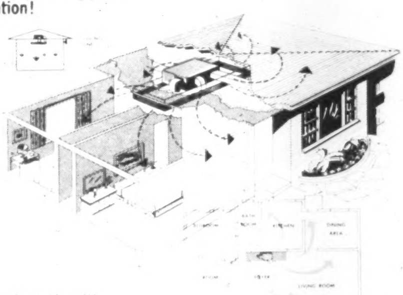
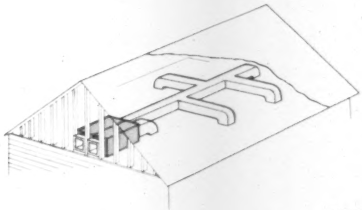
Now, Fedders, the world's largest selling air conditioner, makes efficient steam or hot water heating plus central air conditioning a practical reality for homes in the lowest price range. This Adaptomatic all-in-one air cooled unit fits anywhere in any type of home . . . Colonial . . . Cape Cod . . . Contemporary . . . without costly structual alterations. It slashes installation costs by hundreds of dollars. Factory-built . . . factory-tested . . . factory-guaranteed.

ENGINEERED FOR EVERY TYPE OF APPLICATION

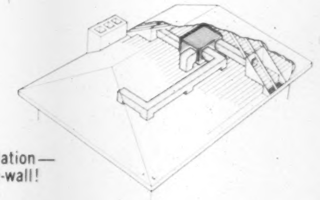
Central drop-ceiling plenum installation!



Only Adaptomatic with Pressurized Condenser Air permits this low-cost application which does away with cold-air ducts!

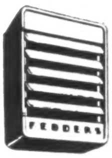


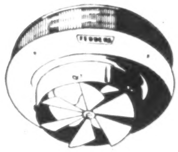
Attic installation—interior location!



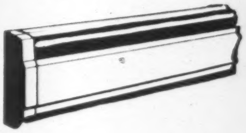
Attic installation—through-the-wall!

FEDDERS COMBINES WET HEAT AND CENTRAL COOLING AT LOW COST

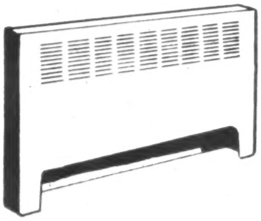




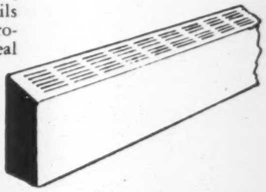
FEDDERS BASEBOARD RADIATION made in types and capacities for every installation and budget need to help bring wet heat home to Mr. and Mrs. America.



FEDDERS UNIT HEATERS, Horizontal, Downblow and Cabinet Unit Heaters for every hard-to-heat installation.



FEDDERS WALL RADIATION, the successor to pipe coils and cast iron radiation, provides high output per lineal foot.



FEDDERS CONVECTOR RADIATORS made in a wide variety of sizes for free standing, semi and fully recessed installations.

FEDDERS CONTINUOUS CONVECTOR RADIATORS for long runs on exposed walls.

FEDDERS-QUIGAN CORPORATION

Heating Division

LALOR and HANCOCK STS. • TRENTON, N. J.

ANNOUNCING . . .

a major advance in expansion joint design

New Zallea Self Equalizing Expansion Joints offer four important advantages. Years of continuous research have resulted in a new Self Equalizing Expansion Joint that lasts longer, is substantially shorter, one-third lighter, and has greater stability.

Longer life. Hundreds of cycling tests to destruction prove that you can expect as much as 100% longer life from the new Zallea Self Equalizing Expansion Joint.

Lighter weight. Weight of the expansion joint has been reduced as much as one-third. Handling and installation are easier.

Shorter length. Over-all length has been reduced as much as 30%.

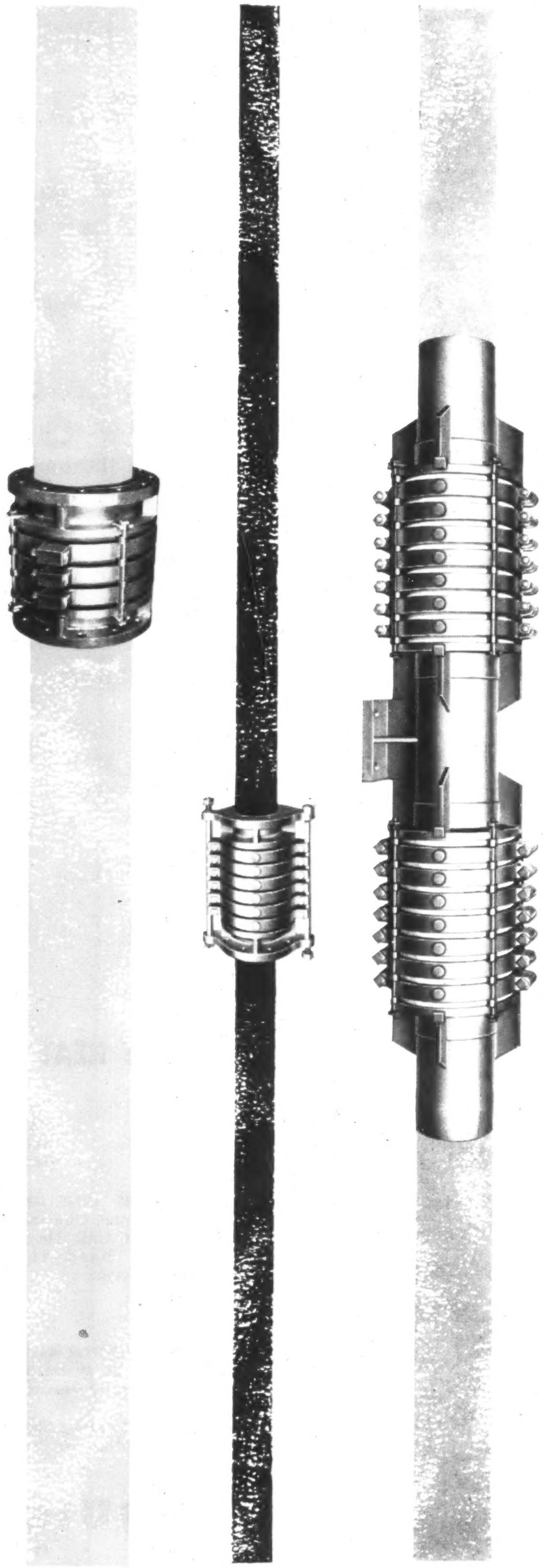
Greater stability. Reduction in ratio of length to diameter means higher stability at high test pressures—no need to support the expansion joint to prevent buckling during test.

Sizes and traverses. Sizes range from 3″ diameter to 72″ diameter, for traverses up to 7½″ in a single unit or 15″ in a double unit.

Working pressures. Although normally intended for 150 and 300 psig working pressures, Self Equalizing Expansion Joints can be designed for higher pressures.

Service. The Self Equalizing Expansion Joint is ideal for applications in long lines when there is considerable axial expansion and infrequent movement . . . such as district heating lines which seldom cool down during the heating season.

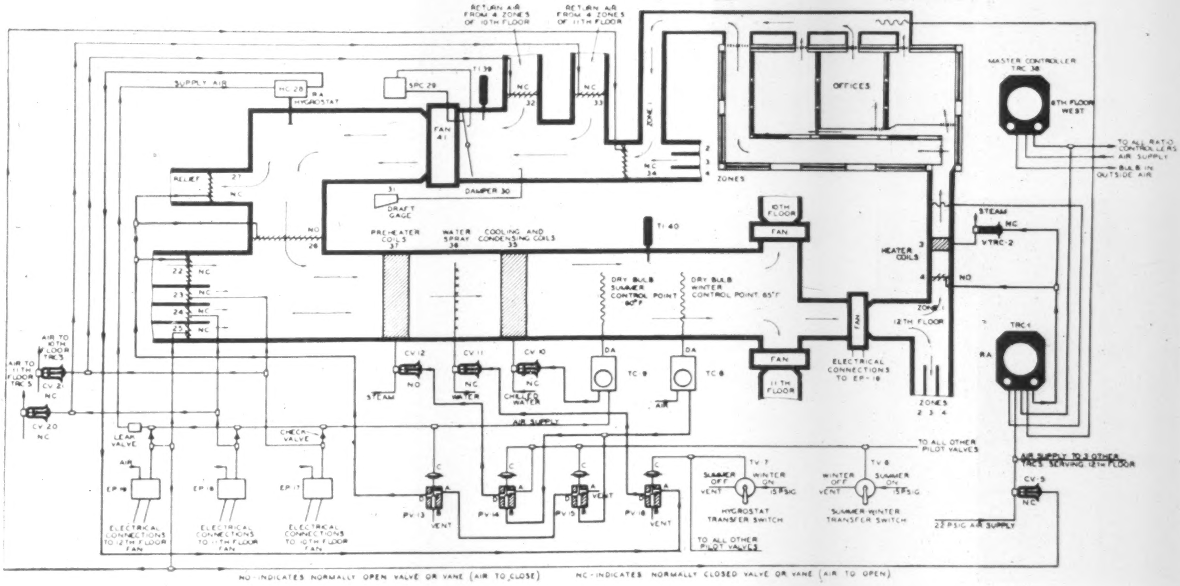
Get the complete story of the new Zallea Self Equalizing Expansion Joint in our newly published 72-page Zallea Expansion Joint Manual. Write today, on your Company letterhead, for your copy of Catalog 56. Zallea Brothers, 816 Locust Street, Wilmington 99, Delaware.



Zallea

expansion joints

Zallea Brothers, Wilmington 99, Delaware • World's largest manufacturer of expansion joints


RETURN AIR FROM 4 ZONES OF 10TH FLOOR
RETURN AIR FROM 4 ZONES OF 11TH FLOOR
SUPPLY AIR
HC 28
RA HYGROSTAT
SPC 29
TI 39
NC 32
NC 33
FAN 41
ZONE 1
OFFICES
MASTER CONTROLLER TRC 38
8TH FLOOR WEST
TO ALL RATIO CONTROLLERS
AIR SUPPLY
BULB IN OUTSIDE AIR
RELIEF
27 NC
NC 34
2 3 4 ZONES
DAMPER 30
31 DRAFT GAGE
NO 26
PREHEATER COILS 37
WATER SPRAY 36
COOLING AND CONDENSING COILS 35
TI 40
10TH FLOOR
FAN
STEAM
NC
VTRC-2
HEATER COILS
3
4 NO
22 NC
23 NC
24 NC
25 NC
DRY BULB SUMMER CONTROL POINT 60°F
DRY BULB WINTER CONTROL POINT 65°F
ZONE 1
12TH FLOOR
TRC 1
RA
FAN
AIR TO 10TH FLOOR TRCS
AIR TO 11TH FLOOR TRCS
CV 21 NC
CV 20 NC
CV 12 NO
STEAM
CV 11 NC
WATER
CV 10 NC
CHILLED WATER
DA
TC 9
DA
TC 8
AIR
FAN
11TH FLOOR
ELECTRICAL CONNECTIONS TO EP-10
ZONES 2 3 4
AIR SUPPLY
LEAK VALVE
CHECK VALVE
AIR
EP 19
EP 18
EP 17
TO ALL OTHER PILOT VALVES
C
A
D
B
PV 13
VENT
PV 14
PV 15
VENT
PV 16
VENT
TV 7
SUMMER OFF
VENT
WINTER ON
15 PSIG
HYGROSTAT TRANSFER SWITCH
TV 8
WINTER OFF
VENT
SUMMER ON
15 PSIG
SUMMER-WINTER TRANSFER SWITCH
AIR SUPPLY TO 3 OTHER TRCS SERVING 12TH FLOOR
CV 5
NC
22 PSIG AIR SUPPLY
TO ALL OTHER PILOT VALVES
ELECTRICAL CONNECTIONS TO 12TH FLOOR FAN
ELECTRICAL CONNECTIONS TO 11TH FLOOR FAN
ELECTRICAL CONNECTIONS TO 10TH FLOOR FAN
NO-INDICATES NORMALLY OPEN VALVE OR VANE (AIR TO CLOSE)
NC-INDICATES NORMALLY CLOSED VALVE OR VANE (AIR TO OPEN)

33 STORIES OF CONSTANT COMFORT

controlled by Taylor!

THE ESSO BUILDING at Rockefeller Center is kept comfortable 12 months a year with a Taylor-controlled air conditioning system—one of the largest and most efficient ever installed. Buensod-Stacey, Engineering Contractors, installed this system which was designed by Pollack and Grieve, Consulting Engineers.

Above is a typical control center and one of the 12 control zones (shaded area) of the three floors which it serves. The Taylor Ratio Controller for each zone (lower right) increases or decreases temperature of incoming air according to demand for that zone. All 169 zone Ratio Controllers are reset automatically by the Master FULSCOPE* Temperature Controller (top right) so that as outdoor temperature increases, indoor temperature is automatically increased in a pre-determined ratio. The system dehumidifies and cools the building in Summer; humidifies and heats it in Winter. Master Seasonal Transfer Switches on main control panel in sub-basement give the operating engineer automatic control of all these functions for the 500,000 cubic feet of air circulated in the building *every minute.*

Whether you need air conditioning for human comfort or product quality, Taylor Automatic Control will help you get top efficiency out of your equipment. Ask your Taylor Field Engineer! **Write for Catalog 5.** Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

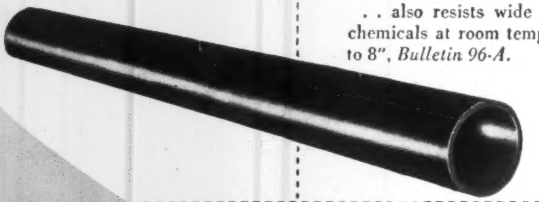
Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

*Reg. U.S. Pat. Off.

Only the Right piping can deliver a "GOOD RUN"

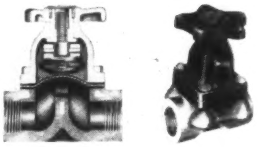
For profitable runs you must keep equipment "on stream" full time with no corrosion shut-downs. Protect your profits with Ace piping, pumps, valves, and tanks. Many rubber and plastic materials . . . backed by a century of chemical experience. Get facts today from American Hard Rubber Company.



FOR HOT CORROSIVES:
ACE TEMPRON

Heat-resistant nitrile hard rubber pipe handles inorganics at 250-275 deg. F. . . also resists wide range of organic chemicals at room temperature. Sizes 1" to 8", *Bulletin 96-A.*

VALVES
for all-plastic piping systems



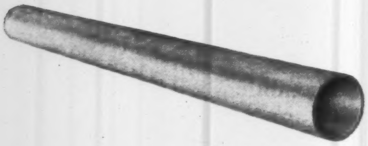
Trouble-free plastic diaphragm valves . . . choice of general-purpose ACE-ITE, ACE PARIAN (polyethylene) or ACE SARAN. Handles most corrosive chemicals and food ingredients. Sizes ½" to 2", 50 psi. at 77 deg. F. *Bulletins 80 and 351.*

RIGID VINYL . . . STRONG, AGE-PROOF

ACE RIVICLOR is a new rigid threaded plastic pipe with good aging and high impact strength. Not affected by most inorganic acids and alkalis, also excellent for many organics. Sizes ½" to 4". *Ask for Bulletin CE-56.*

STAYS TOUGH
AT SUB-ZERO TEMPERATURES

ACE PARIAN . . . odorless, tasteless, rigid polyethylene. Best chemical resistance of any plastic at room temp, except to acetic acid. Excellent impact strength at sub-zero temp. Rigid pipe ½" to 2". *Bul. 351.*



TOUGH ACE-ITE PLASTIC PIPE

General-purpose moderately priced rubber-plastic pipe handles most common chemicals to 170 deg. F. . . . except few strong acids and organic solvents. Tough, odorless, tasteless. Rigid pipe ½" to 6". *Bulletin 80.*

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

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This practical book is made up of outstanding papers and data on industrial piping selected from past issues of "Heating, Piping & Air Conditioning." It is a most comprehensive collection of case studies, showing how various difficult piping problems encountered in different industrial plants were successfully worked out by piping experts.

Design, installation, operation, and maintenance . . . steam, air, gas, oil, process, water and refrigeration piping . . . piping in pulp and paper and steel mills, in automobile plants and breweries, in the food and chemical and textile industries, and in many other types of manufacturing plants are dealt with from many different angles.

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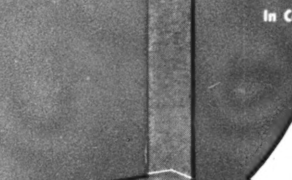
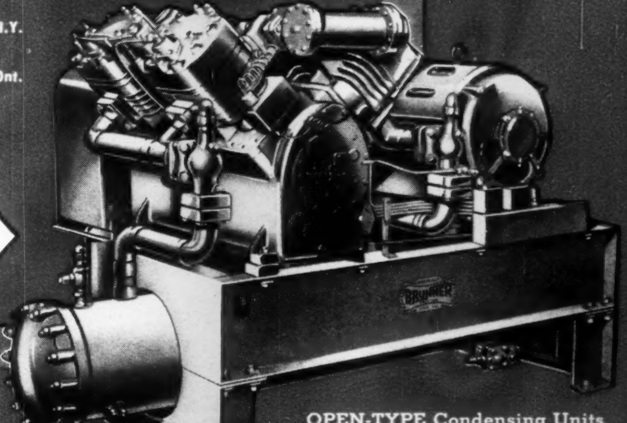
BRUNNER
SINCE 1906

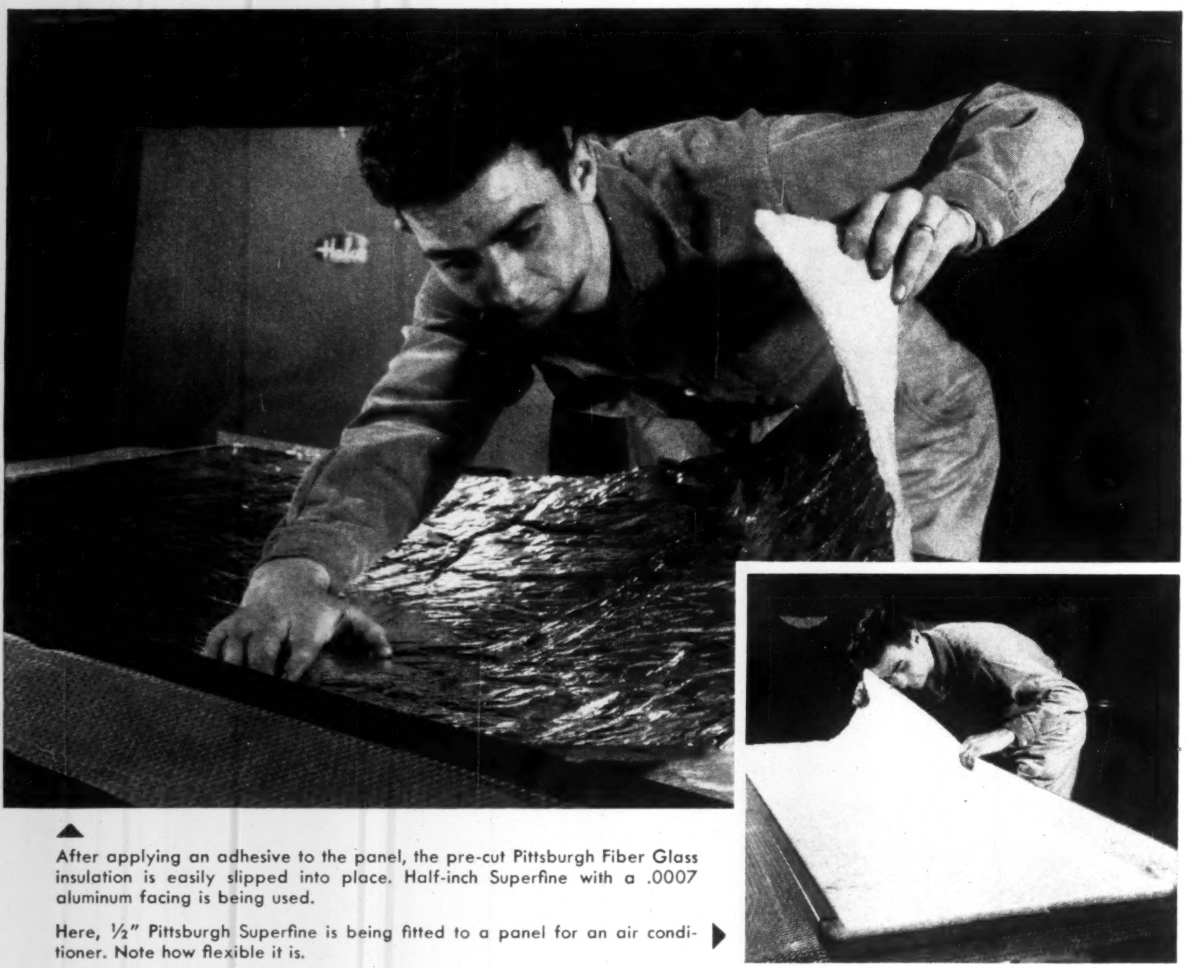


BRUNNER-METIC semi-hermetic Refrigeration Condensing Units from ¼ H.P. through 3 H.P.



OPEN-TYPE Condensing Units available from ¼ H.P. through 100 H.P.

BRUNNERIZE FOR DEPENDABLE REFRIGERATION AND AIR CONDITIONING



▲ After applying an adhesive to the panel, the pre-cut Pittsburgh Fiber Glass insulation is easily slipped into place. Half-inch Superfine with a .0007 aluminum facing is being used.

Here, ½" Pittsburgh Superfine is being fitted to a panel for an air conditioner. Note how flexible it is. ▶

"We choose Pittsburgh Fiber Glass Insulation because of its consistent specifications and roll-after-roll dependability"

HALL-NEAL FURNACE CO., INDIANAPOLIS, IND.

"An insulating material must be many things," says Robert A. Hoyt, Production Manager at Hall-Neal, "but above all, it must be consistent throughout the roll. Insulation with fibers in varying densities causes 'hot spots' which result in discolored casing, heat loss, and higher fuel bills.

"After trying other types of insulation, we made a 100% change to Pittsburgh Superfine Fiber Glass because of excellent quality and service, close engineering cooperation, realistic price, and fast, dependable delivery."

If you manufacture or install furnaces, air conditioners, or related ductwork, you'll want to know how Pittsburgh Plate Glass Company's Superfine Fiber Glass insulation can exactly meet your insulating requirements. For complete information, write for Bulletins F-100, F-185 and F-190. Address your inquiries to the Fiber Glass Division, Pittsburgh Plate Glass Company, One Gateway Center, Pittsburgh 22, Pennsylvania. Or, for quick service on your specific problem, call the nearest Pittsburgh Fiber Glass Sales Office listed below.

PITTSBURGH SUPERFINE FIBER GLASS IS A PRODUCT OF THE FIBER GLASS DIVISION OF PITTSBURGH PLATE GLASS COMPANY

Sales Offices are located in the following cities: Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, and St. Louis

FIBER PPG GLASS

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PITTSBURGH PLATE GLASS COMPANY

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ELECTRO-WHEEL® BLOWER

Quiet, Trouble-Free Efficiency Is Yours With Electro-Wheel

Are you interested in a blower unit that practically eliminates the need for service . . . delivers more air against higher statics . . . operates more quietly . . . and is more compact? *Electro-Wheel gives you all this, and more!*

The torque from the split capacitor motor is delivered directly to the rotor wheel. Electro-Wheel thus eliminates bearing and shaft journals, belt and pulleys . . . and resulting efficiency losses. *Take out all these moving parts and the need for service is virtually eliminated!* Much quieter, too!

The bearing bracket is inverted to pick up the shaft *inside* the housing. Electro-Wheel is *unmatched for compactness because no part extends beyond the scroll side.*

Electro-Wheel is versatile. Scroll sides are prepunched so that housing supports may be applied to obtain four angles of discharge. Provision is made for attaching BX for electrical connectors and for variable-speed, electrical control.

Your Lau representative will be pleased to explain your advantages with Electro-Wheel. *Range of sizes available.*

See Us February 25 to March 1 at Booth 836, International Air Conditioning Exposition, Chicago, sponsored by ASH&AE.

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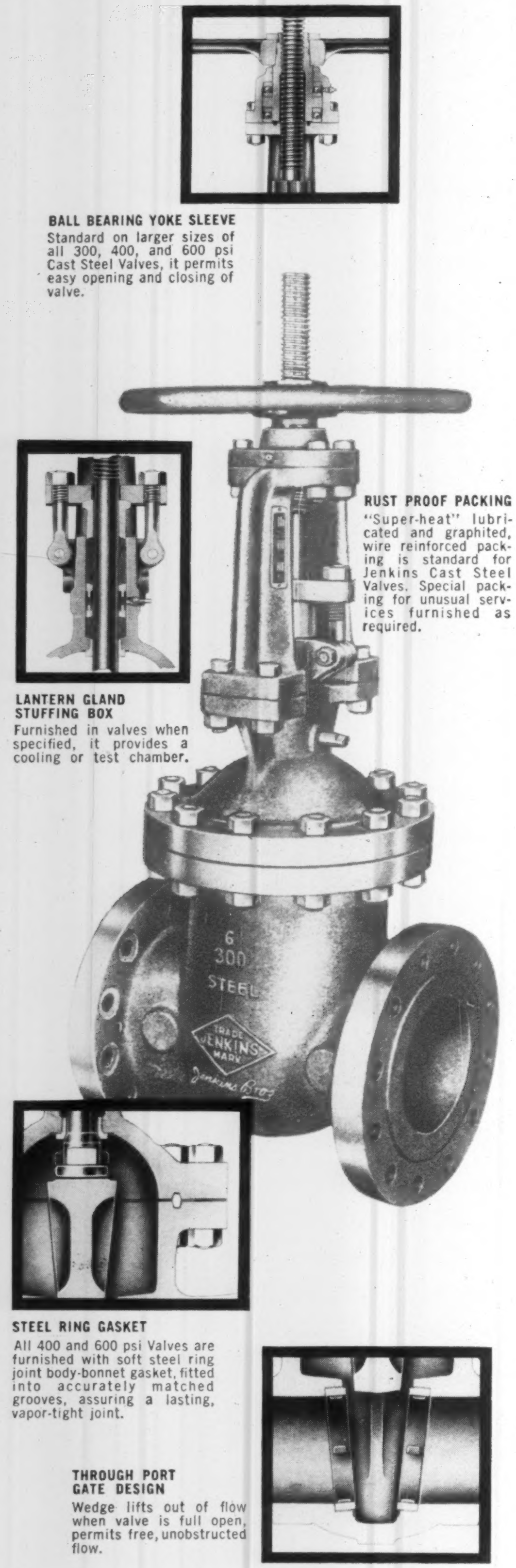
World's Largest Manufacturer of Air-Conditioning Blowers



BALL BEARING YOKE SLEEVE
Standard on larger sizes of all 300, 400, and 600 psi Cast Steel Valves, it permits easy opening and closing of valve.

RUST PROOF PACKING
"Super-heat" lubricated and graphited, wire reinforced packing is standard for Jenkins Cast Steel Valves. Special packing for unusual services furnished as required.

LANTERN GLAND STUFFING BOX
Furnished in valves when specified, it provides a cooling or test chamber.

STEEL RING GASKET
All 400 and 600 psi Valves are furnished with soft steel ring joint body-bonnet gasket, fitted into accurately matched grooves, assuring a lasting, vapor-tight joint.

THROUGH PORT GATE DESIGN
Wedge lifts out of flow when valve is full open, permits free, unobstructed flow.

for design features that deliver
top-rated efficiency . . . lasting economy

JENKINS
CAST STEEL
VALVES

The details shown are only a few of the many design features developed by Jenkins valve specialists to make Jenkins Cast Steel Valves a match for the most punishing requirements of higher pressure, higher temperature services.

You can get the required combination of casting alloys and seating metals for services up to 600 psi — 1000°F. With any valve specified, you get the *plus* of Jenkins *extra value*, — in performance, in lasting economy.

Compare every feature, and you'll see why Jenkins Cast Steel Valves are first choice for so many systems planned for lowest operating cost.

PATTERNS	Gates 2″ to 24″ — Globes 2″ to 10″ — Angles 2″ to 10″ — Swing Checks 2″ to 12″. Non-return, stop and check Globes and Angles, 4″ to 10″ Screwed, Flanged, or Weld Ends
PRESSURES	150 lb. — 300 lb. — 400 lb. — 600 lb.
PRESSURE CASTING ALLOYS	Carbon Steel — 150 lb. Valves Carbon Molybdenum Steel — 300, 400, 600 lb. Valves Chromium Molybdenum Steel (when ordered)
SEATING METALS (in various combinations)	H Monel 13% Chromium Stainless Steel Carbon Molybdenum Steel, Stellite faced AISI Type 316 Stainless Steel

GET THE JENKINS CAST STEEL VALVE CATALOG

It describes all patterns, casting alloys, and seating combinations, with details of the *extra value* design and construction features. Gives pressure-temperature ratings, dimensions, and other technical data. Get a copy from your Jenkins Valve Distributor, or write: Jenkins Bros., 100 Park Ave., New York 17.

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Valves

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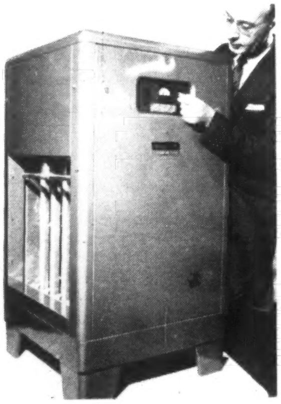
EQUIPMENT DEVELOPMENTS . . .

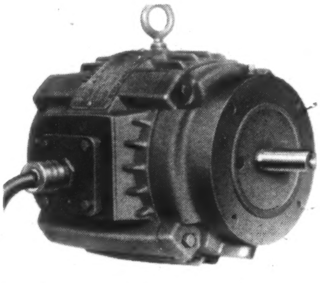
For reviews of Recent Trade Literature see Page 372



Electronic Air Cleaner . . .

. . .designed to deliver 13,000 volt "knockout blow" to tiny airborne particles *Minneapolis-Honeywell Regulator Co., Dept. HPAC, 2753 Fourth Ave., S., Minneapolis 8.*

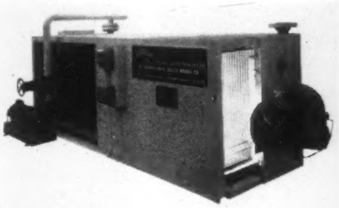
Each invisible atom of dust is given high voltage electrical charge, is then attracted to negatively charged collector plates, says company. Dust is then washed away by water spray. Engineered to collect particles of less than 1/5000 in. size.



Air-Over Motors . . .

. . .designed to produce varying horsepower according to application of varying air velocities—*Reliance Electric & Engineering Co., Dept. HPAC, 1088 Ivanhoe Rd., Cleveland 10.*

Effect accomplished by cooling effect of air flow over motor frame created by fan or blower it powers, says company. Is said to facilitate increased power output without exceeding rated temperature rise of motor. Cited features of totally enclosed, a-c unit are cast iron ribbed frame construction, oversized double-shielded ball bearings, "metermatic" lubrication with automatic grease relief. Available in new NEMA frame sizes ½ to 30 hp.



Hot Water Generator . . .

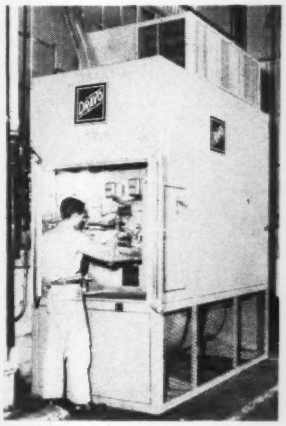
. . .with small sized construction designed for apartment houses, schools, hospitals, similar installations—*International Boiler Works Co., Dept. HPAC, East Stroudsburg, Pa.*

"International-LaMont" forced recirculation type unit engineered to produce steam from high temperature hot water when desired. Rated 2 million Btu per hr output.

Air Conditioning Unit . . .

. . . designed to provide year 'round comfort from same piping system—*Airtherm Mfg. Co., Dept. HPAC, 711 S. Spring Ave., St. Louis 10.*

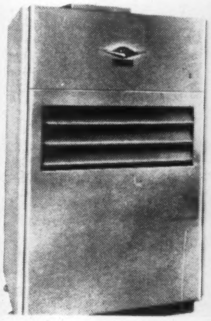
In existing buildings, can use same pipe and central system by adding insulation and chiller. In new buildings, unit room control of temperature, humidity, ventilation provided without ductwork, says company. Designed for quiet operation suitable for hospitals, similar applications. Available in four series ½ to 2 ton nominal cooling capacity, 160 to 600 cfm, for cabinet or concealed installation, floor or ceiling.



Space Heaters . . .

. . .with new concept of burning fuels—*Dravo Corp., Dept. HPAC, Neville Island, Pittsburgh 25.*

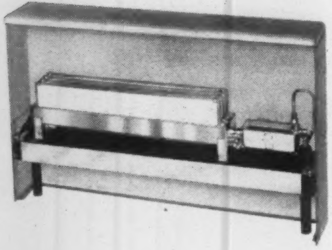
Unique heating principle has been incorporated in company's 1957 series of "Counterflo" direct fired forced air units, says manufacturer. Is said to give increased operating efficiency through greater air-heat volumes, reduced fan horsepower requirements. Units available in nine sizes 250,000 to 2 million Btu per hr output. Cited feature is induced draft "Pyro-Jet" burner for gas, light oil, heavy oil, or combination gas/light oil firing.



Heat Pump . . .

. . .in capacities 3 to 15 hp, twin circuit dual 10 and 15 hp packaged chillers, air cooled condensers, air handling units—*American Coils Co., Dept. HPAC, 360 Thomas St., Newark, N.J.*

"Comfortaire" heat pump equipment (illustrated), for commercial and residential applications, is of water to air type, "will produce full rated capacity no matter what outside temperature if 50 to 70 F water is available," says manufacturer. New 10 and 15 hp packaged chillers, for water and liquids, make five sizes of these units, in range 3 hp through 15 hp, now available. Air cooled condensers are of 3, 5 and 7½ hp size, and air handling units are offered in 3 to 15 hp range.



Humidifier . . .

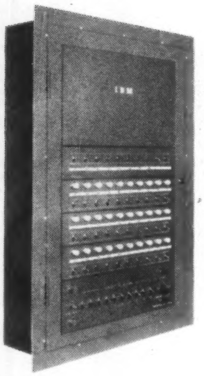
. . .designed especially for modern convector radiators—*Maid-O'-Mist, Inc., Dept. HPAC, 3217 N. Pulaski Road, Chicago 41.*

Units are said to supply ample humidification for either cast iron or copper convector radiators. In 10 sizes with operating capacities 1 to 5 gal per day of water. Cited feature of unit is that it is completely automatic. Available in both 2 and 4 trough units.

Electrode . . .

. . .for general purpose use—*Air Reduction Sales Co., Dept. HPAC, 150 E. 42nd St., New York 17.*

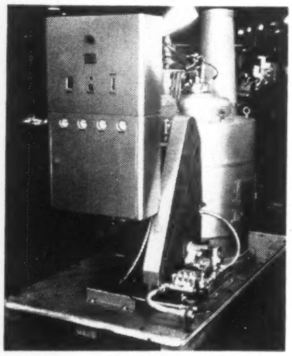
Meets AWS and ASTM E-6013 classification. Is heavily coated electrode of moderate arc force designed to operate in all positions on a-c or d-c. Recommended by company for welding mild steel to medium carbon and low alloy steels.



Electronic Supervisor . . .

. . .for automatically switching *on* or *off* up to 40 groups of remote operations, each on its own time schedule—*International Business Machines Corp., Dept. HPAC, 590 Madison Ave., New York 22.*

Designed to control heating and air conditioning, start and stop motors, open and close valves, similar operations. Cited feature of system is that it does not require installation of transmission wire, utilizing existing power and lighting circuitry for transmission of supervisory pulses.



Steam Generator . . .

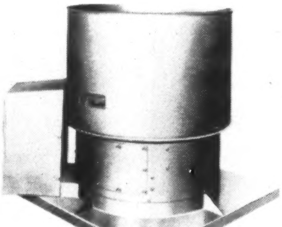
. . .rated 60 hp—*Vapor Heating Corp., Dept. HPAC, 6420 W. Howard St., Chicago 31.*

"Model 4615" produces 400 to 1750 lb per hr of steam from 60 F feedwater at 75 to 300 lb steam pressure. Unit has only 99 sq ft of heating surface, says company. Is said to develop 200 lb steam pressure in 2 min from cold water. Automatic controls cause generator to cycle *on* and *off*, change volume of steam produced to meet changing steam demand, without manual adjustment.

Double Fan . . .

. . .power roof ventilators, and new ventilating unit—*Buffalo Forge Co., Dept. HPAC, 490 Broadway, Buffalo 4, N.Y.*

Identified as "No. 890 BLH," fan has new design outlet, variable cantilever inlet vanes. V and H "Sky Vent" power roof ventilators are suitable for high velocity, high capacity exhaust installations. "Model H Shortboy" is new ventilating unit featuring tubular construction, with hollow shaft and external bearings.



Power Roof Ventilators . . .

. . .with "certified" ratings—*American Blower Corp., Dept. HPAC, Detroit 32.*

Units feature redesigned fan wheel said to produce optimum efficiency when operating within type of enclosure formed by power roof ventilator housing. Line includes four models: upblast type exhaust ventilator, hood type exhaust ventilator, hood type supply ventilator, air intake hood. "Model VRV" upblast type unit (shown) available in 16 sizes for certified rated deliveries to 52,200 cfm (measured at zero static pressure).

Packaged Heat Pump . . .

. . .for year 'round commercial air conditioning—*Carrier Corp., Dept. HPAC, Syracuse 1, N.Y.*

Packaged units designed to cut both first and operating costs for such equipment, reduce space needed indoors to minimum. Heat pump "Weathermaker" employs outdoor air as source of heat; is divided into two units, with indoor unit little larger than a room air conditioner, says company. To be available initially in 5 hp model.

A REFRIGERATOR, TOO, CAN BE THE STRONG, SILENT TYPE

One home refrigerator with a reputation for silence and long service life depends upon B&W for "the type of tubing necessary to the efficient operation of the refrigerator. Without it, the refrigerator could not provide the required performance. It must last the life of the unit."

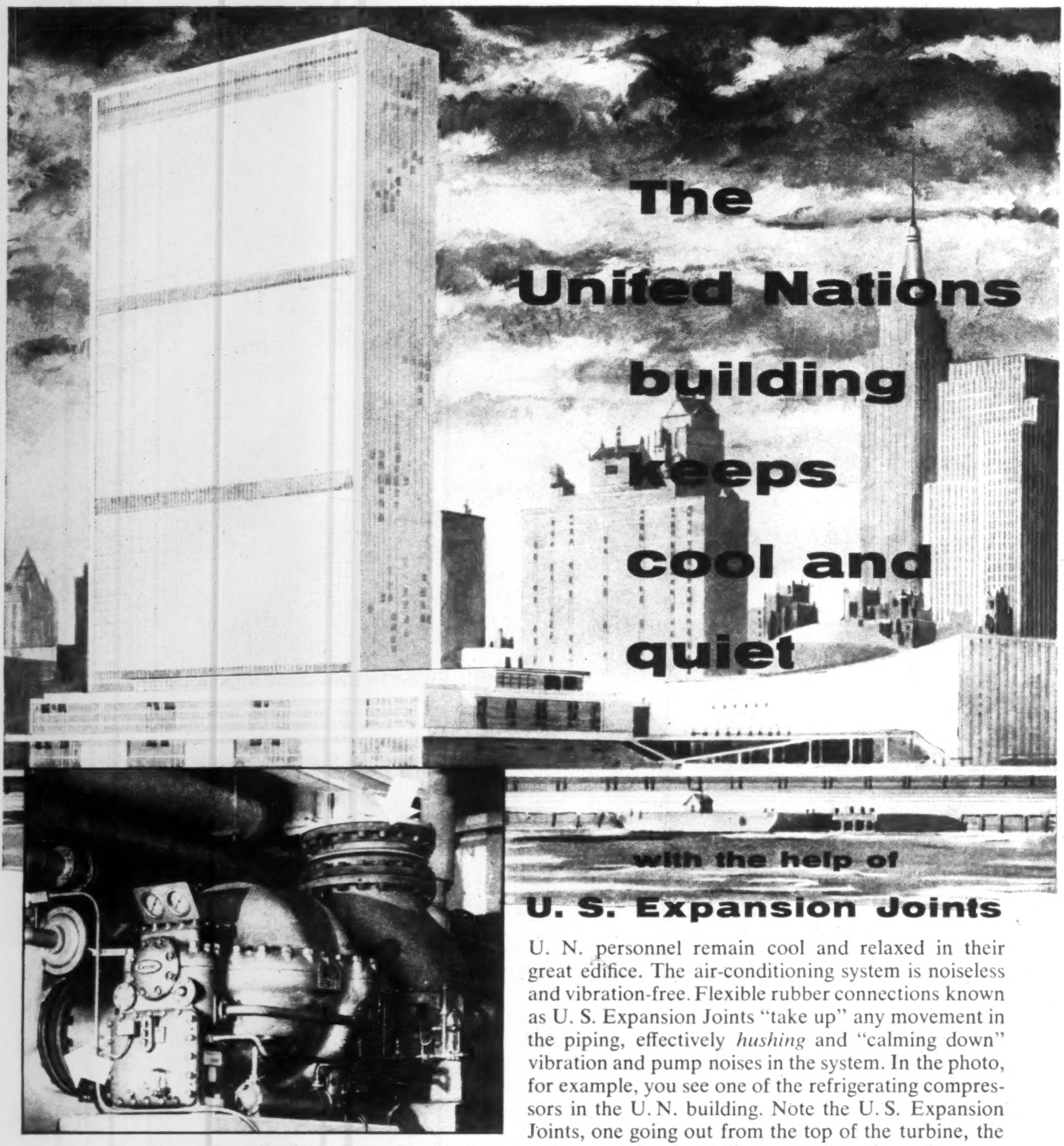
To meet that tough specification for evaporator coils and high temperature coils, B&W supplies Electric-Resistance-Welded Tubing with precision-made serrations on the I.D. Rockwell hardness must be held within close tolerances, and the seam-weld must withstand 1,000 pounds pressure—no interior surface copper is permitted.

For special applications like this, get in touch with Mr. Tubes, whose specialty is matching tubes to jobs to save you time and money. For many Electric-Resistance-Welded tubing requirements, you'll find that your nearby B&W distributor maintains comprehensive stocks to meet your needs. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

B&W
TUBULAR PRODUCTS
DIVISION

Seamless and welded tubular products, seamless welding fittings and forged steel flanges in carbon, alloy and stainless steels

TA-6074-GP



The United Nations building keeps cool and quiet

with the help of U. S. Expansion Joints

U. N. personnel remain cool and relaxed in their great edifice. The air-conditioning system is noiseless and vibration-free. Flexible rubber connections known as U. S. Expansion Joints "take up" any movement in the piping, effectively *hushing* and "calming down" vibration and pump noises in the system. In the photo, for example, you see one of the refrigerating compressors in the U. N. building. Note the U. S. Expansion Joints, one going out from the top of the turbine, the other from the side. U. S. Expansion Joints are also used for the chilled-water lines from the water chillers and the refrigerating lines from the refrigerating compressors; also on the water lines to and from the cooling towers.

A product of United States Rubber Company, these joints also offset stresses caused by expansion and contraction. Since they have no moving parts to wear or bind, U. S. Expansion Joints last a long time. Some are still in service after 30 years—a record unmatched by any other joint!

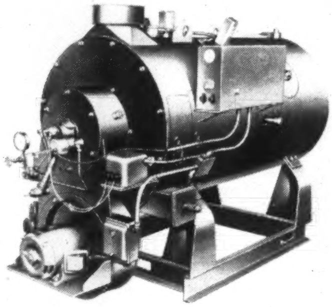
For any pipe line where noise and vibration are problems, contact any of the 28 "U. S." District Sales Offices or write U. S. Rubber, Mechanical Goods Div., Rockefeller Center, New York 20, N. Y.

UNITED STATES RUBBER COMPANY

US RUBBER

Mechanical Goods Division

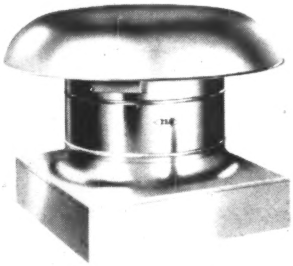
United States Rubber



Packaged Generators . . .

. . . designed for forced circulation hot water systems—*Cyclotherm Div., National-U.S. Radiator Corp., Dept. HPAC, Oswego, N.Y.*

Outputs range 670,000 to 6,700,000 Btu, 1467 to 44,667 gross EDR. Engineered to handle varying requirements of large or small hot water heating systems, singly or in battery. For burning oil, gas, or combination.



Power Roof Ventilators . . .

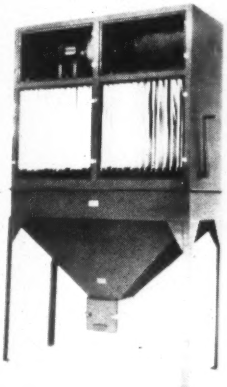
. . . for "positive" intake of outdoor air—*Ilg Electric Ventilating Co., Dept. HPAC, 2850 N. Pulaski Rd., Chicago 41.*

Units reverse conventional ventilating procedure—blow air *in* instead of *out*. Available in five sizes with low and high speed models ranging 1310 to 14,880 cfm.

Control Centers . . .

. . . for heating, air conditioning systems—*Barber-Colman Co., Dept. HPAC, 1300 Rock St., Rockford, Ill.*

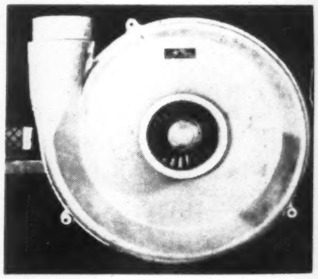
Manufacturer's new line includes unit ventilator control system with new dual bulb thermostat designed for uniform control of discharge air temperatures; two new models of electronic combustion safeguard equipment; two new models of electronic indicating and recording thermometers; new design of electronic multipoint recorder.



Dust Collector . . .

. . . designed to handle heavy duty continuous grinding, other high dust volume sources—*Torit Mfg. Co., Dept. HPAC, 287 Walnut St., St. Paul 2.*

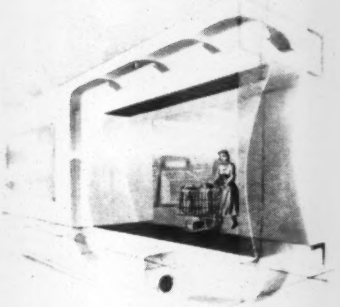
Unit has dust storage capacity of 10 cu ft, filter area of 300 sq ft. Unit's 5 hp motor moves 2000 cfm of air through 8 in. inlet at high speeds. Static pressure for inlet is 3½ in. WG.



Centrifugal Blower . . .

. . . engineered to operate in 4 psig range—*Turbo Research Corp., Dept. HPAC, 1630 Euclid St., Santa Monica, Calif.*

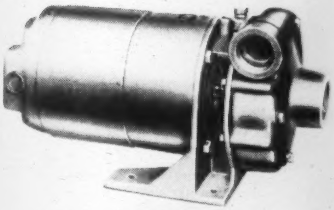
Previous blowers of this type were limited to 2 psig operation, says company. Is said to have greatly reduced noise level. Delivered volume with standard inlet conditions is 1300 cfm at 8000 rpm against 4 psig discharge head.



"Air-Door" . . .

. . . for commercial, industrial applications—*Air-Door, Inc., Div. of New Castle Products, Inc., Dept. HPAC, New Castle, Ind.*

Engineered to protect entrance or opening against infiltration of dust, dirt, insects, foreign matter, weather, etc., without use of ordinary doors.



Centrifugal Pumps . . .

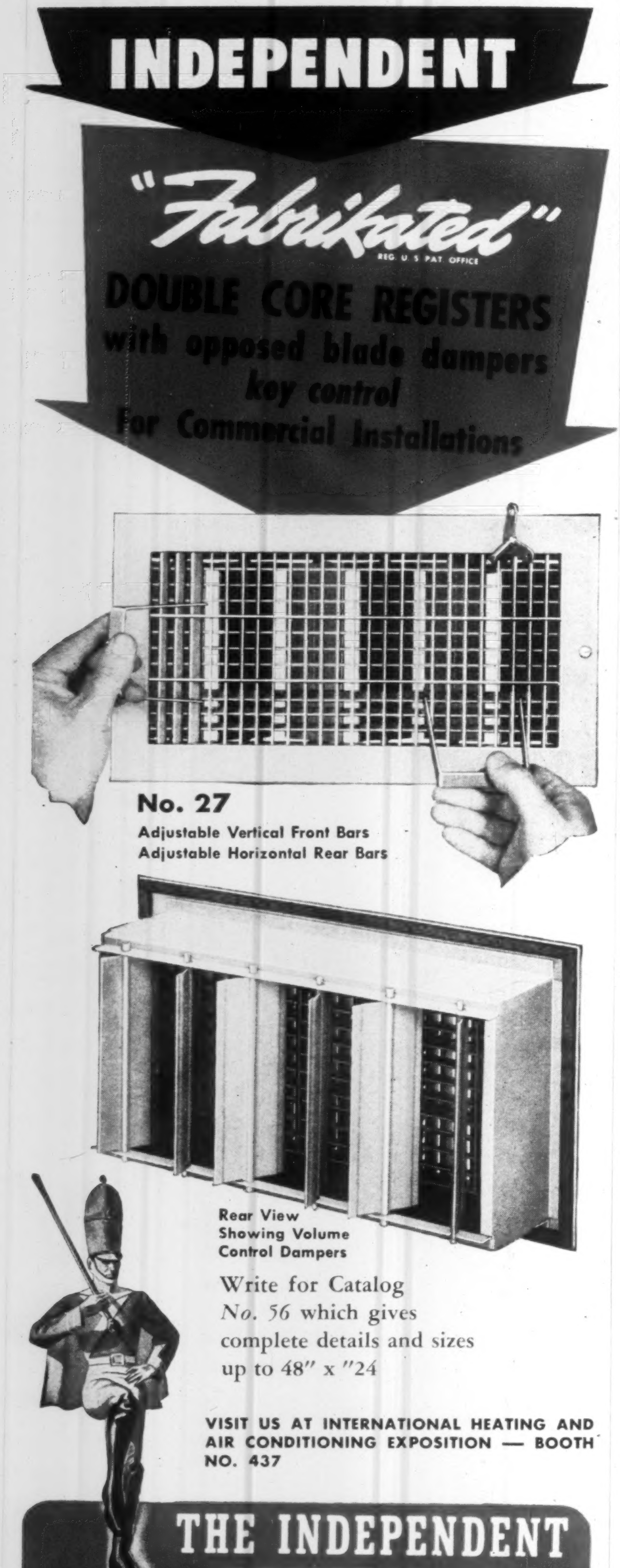
. . . for air conditioning, booster, condensate, other services—*Goulds Pumps, Inc., Dept. HPAC, Seneca Falls, N. Y.*

Close coupled, single stage, enclosed impeller type units engineered for efficiency, simplicity, ruggedness, long and trouble-free service. Motor and pump are single unit. "Fig. 3642" unit available in 1, 1¼ in. sizes with motors ¼ to 2 hp and capacities to 100 gpm. "Fig. 3643" comprises 1½, 2½ in. sizes with 3 to 7½ hp motors for capacities to 350 gpm.

Wall Heater . . .

. . . with draft relief built into heat chamber—*Temco, Inc., Dept. HPAC, 4101 Charlotte Ave., Nashville, Tenn.*

No draft hood is required, says company. Blower attachment designed to provide rapid circulation of heated air.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DOUBLE CORE REGISTERS
with opposed blade dampers
key control
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Showing Volume
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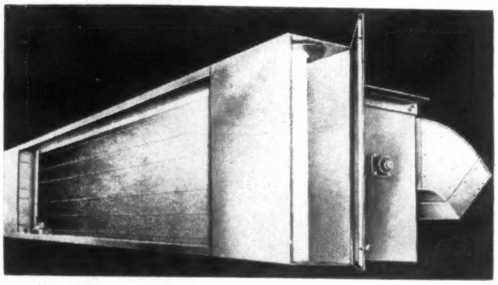
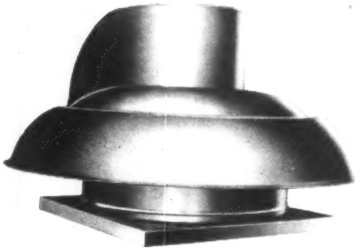


Filter Coil Unit . . .

. . .consisting of fan section, coil section, automatic filter—*American Air Filter Co., Inc., Dept. HPAC, 215 Central Ave., Louisville 8.*

Standard and nonfreeze steam coils, as well as hot and chilled water and direct expansion coils available in variety of sizes, capacities. Various accessories to adapt "Roll-O-Vent" to most any field conditions available, says company.



Centrifugal Roof Ventilator . . .

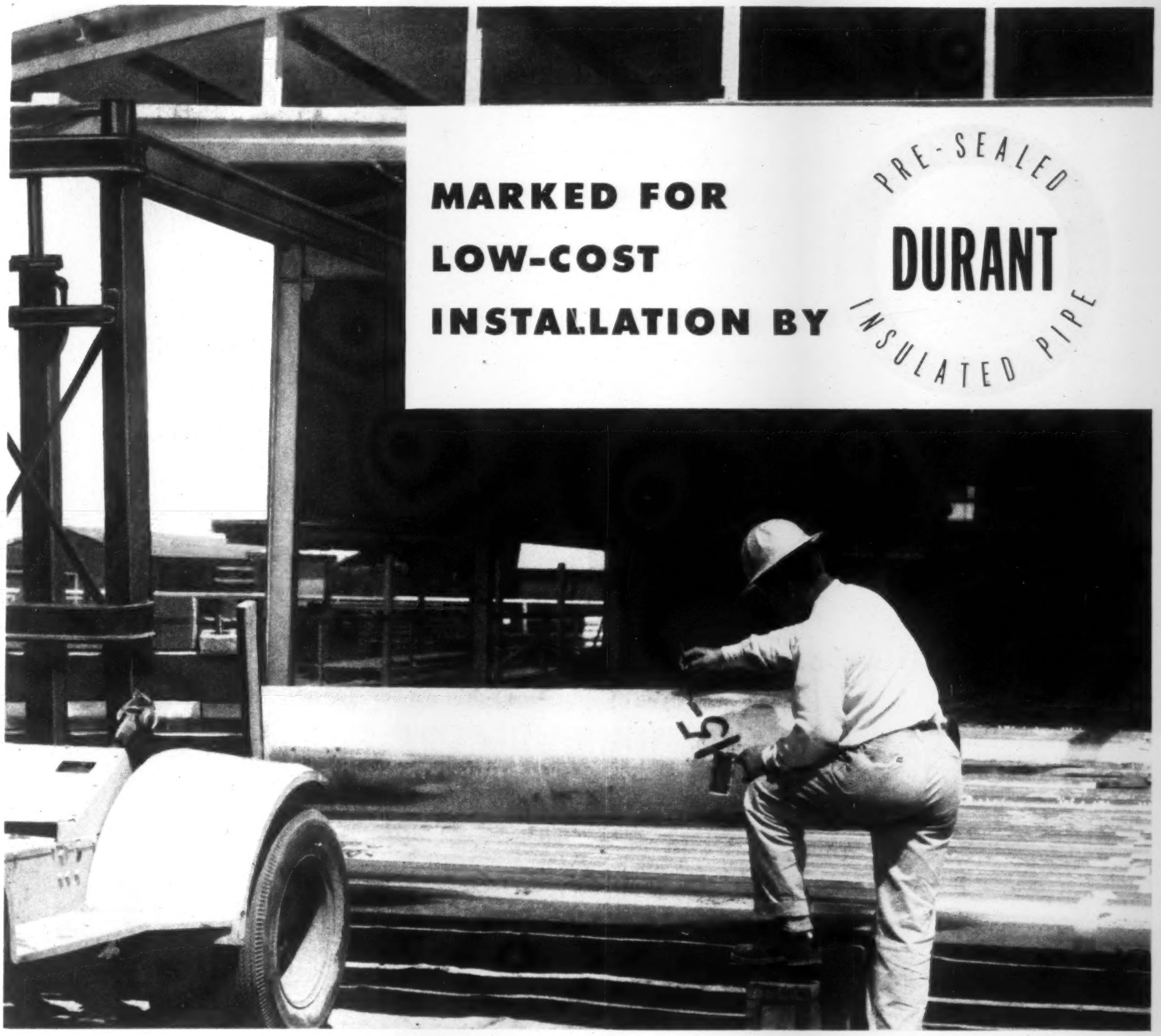
. . .with low silhouette design to complement modern architecture, building construction—*DeBothezat Fans Div., American Machine and Metals, Inc., Dept. HPAC, East Moline, Ill.*

Is said to be very quiet in performance, move large volumes of air efficiently to satisfy exacting ventilation requirements in hospitals, schools, public buildings. In 10 sizes with capacities 1500 to 33,000 cfm.

Evaporative Condensers . . .

. . .with fan located in supply air stream—*Recold Corp., Dept. HPAC, 7250 E. Slauson Ave., Los Angeles 22.*

Design is said to insure long life as fan, shaft, bearings remain dry and are not subjected to saturated air leaving condenser. Dry air is forced through duct, distributed evenly over tube bundle and spray section passing through drift eliminator. This eliminates corrosion, deterioration, scaling of fan and thereby increases life of condenser, says company. To aviod low head pressure when air temperature drops, can be equipped with modulating dampers, controlled by



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● There's no guesswork where each unit fits into the system, when a D.I.P. shipment reaches the job. Every component—fitting, accessory, even straight length—is factory pre-numbered for a specific location matching that shown on system drawings.

Taking the guesswork out of installations is just one way D.I.P. helps you achieve lower original costs on insulated underground piping contracts.

Pre-insulated at the factory, and prefabricated in standard increments, D.I.P. conduit requires only direct top-position pipe welds and simple field joints. No special masonry, underground supports, backfills or sub-drains.

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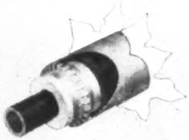

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Easy to cut or score with a knife; easy to install neatly and quickly. Won't absorb moisture or corrode metals.

GUSTIN-BACON announces New Duct Insulation Board

G-B INSULATION BOARD is a semi-rigid insulation board of fine spun mineral fibers bonded together with a thermo-setting resin. It is ideal for use on all types of heating, ventilating, air conditioning or combination ducts where neat appearance and superior thermal efficiency are required.

G-B Insulation Board has a clean, smooth surface that can be spray-or-brush-painted or coated with weatherproofing compounds. For cooling or combination duct use, it comes with factory-applied vapor barrier facing.

Try this new insulation on your very next job. You'll be more than pleased with its performance, appearance and applied cost. A nation-wide network of G-B Distributors stock G-B Insulation Board, as well as G-B ULTRALITE Glass Fiber Duct Insulation and Duct Liner.

FOR INFORMATION AND DELIVERY, CALL YOUR LOCAL G-B DISTRIBUTOR LISTED IN ADJOINING COLUMN

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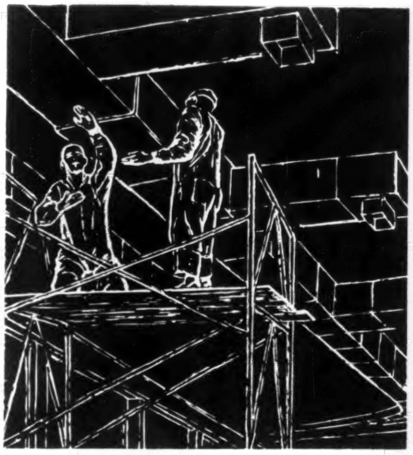
Thermal and acoustical glass fiber insulations • Pipe couplings and fittings • Molded glass fiber pipe insulation

220 W. 10th St., Kansas City, Mo. ***Visit our booth 729-731 at the ASHAE Show***



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ALBUQUERQUE, Mt. States Insulation Co.
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BROOKLINE, Mass., Homans-Kohler, Inc.
BUFFALO, Frontier Insulation & Supply Co.
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JACKSONVILLE, Fla., Ferber Sheet Metal Works, Inc.
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NEW YORK, Eastern Steam Specialty Co.
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OMAHA, Cardinal Supply & Mfg. Co.
PHILADELPHIA, John F. Scanlan, Inc.
PITTSBURGH, Dravo Corp.
PHOENIX, Ariz., Kircher Asbestos & Rubber Co.
RALEIGH, N. C., Southern States Iron Roofing Co.
RICHMOND, Va., Southern States Iron Roofing Co.
ROCKFORD, Ill., Mott Brothers Co.
SALT LAKE CITY, Bullough Asbestos Supply Co.
SAN ANTONIO, The Bracken Co.
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SAN FRANCISCO, Western Fibrous Glass Products
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SEATTLE, Western Fibrous Glass Products
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ST. PAUL, Asbestos Products, Inc.
SYRACUSE, N. Y., Industrial Supply Co.
TAMPA, Fla., Eagle Roofing & Art Metal Works, Inc.
TALLAHASSEE, Fla., Capital Refrigeration & Supply
TULSA, Okla., Ball Distributing & Engr. Co.
TUPELO, Miss., Paine Supply Co.
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WICHITA, General Metals, Inc.
VANCOUVER, B. C., Fleck Brothers Limited

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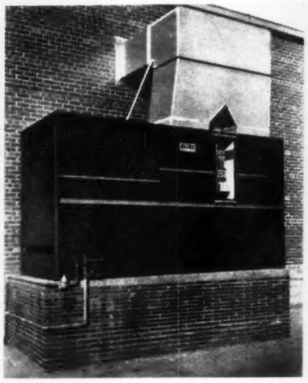
EQUIPMENT DEVELOPMENTS

Continued

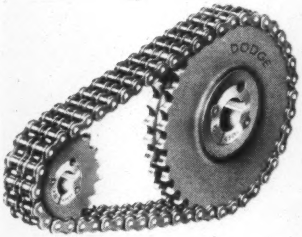
thermostat in condenser water to regulate amount of air through condenser, keep water temperature constant.



Air Conditioning . . .

. . . equipment for outdoor installation—*Alton Mfg. Co., Dept. HPAC, 1112 Ross Ave., Dallas.*

Packaged equipment, manufactured in 10, 15, 20, 25, 30 ton sizes, is said to offer space savings by releasing inside space normally required for air conditioning equipment. Eliminates need for cooling tower through use of special built-in evaporative condenser section and packaging of all component equipment into self contained, skid-mounted unit, says company.

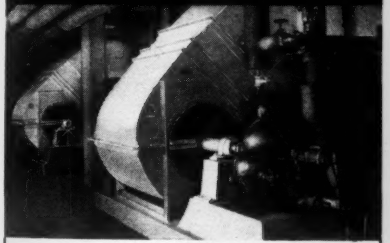


Roller Chain Sprockets . . .

. . . with double strand design—*Dodge Mfg. Corp., Dept. HPAC, Mishawaka, Ind.*

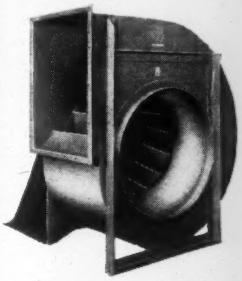
Are said to require no boring, other machining for installation on shafts. Available in pitch sizes ranging ½ to 1 in. Engineered for use with double strand chains.

General Helps Heat a Hospital



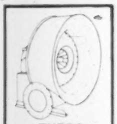
Letchworth Village State Hospital N. Y. State Dept. of Public Works project. Heating Contractor: The Interboro Co., N. Y. C.

CERTIFIED RATINGS
AUTHORIZED BY NAFM



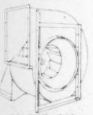
CLASS II construction backward blade centrifugal fan

Shown above is a typical General Blower forced draft installation. The wheel is backward blade, non-overloading, quiet in operation with Spun inlet and wheel cone. General induced and forced draft blowers are skillfully engineered and guaranteed to give long and satisfactory service. Capacities of 200 CFM to 100,000 CFM are handled by standard sizes and arrangements.



TURBO BLOWERS

INDUSTRIAL FANS



CENTRIFUGAL FANS BACKWARD BLADE FORWARD CURVE

GENERAL BLOWERS ARE CUSTOM ENGINEERED

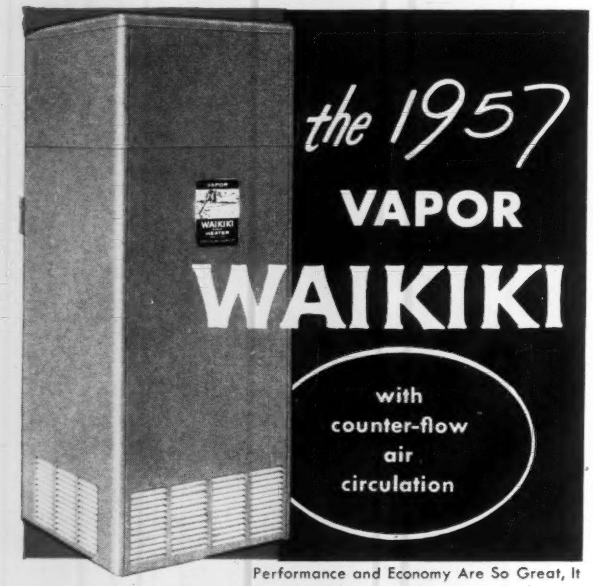
GENERAL BLOWERS FOR EVERY PURPOSE

• Backward blade centrifugal fans • Forward curve centrifugal fans • Util-A-Vent sets • Roof ventilators—Axial flow fans • Propeller fans • Fume exhausters • Turbo pressure blowers • Gas boosters • Steel plate type industrial fans

AMERICA BREATHES EASIER WITH "Lungs for Industry"

GENERAL BLOWER COMPANY
8603 FERRIS AVE., MORTON GROVE, ILL.

INTRODUCING
A REVOLUTIONARY NEW
HIGH-VOLUME SPACE HEATER



Performance and Economy Are So Great, It
ACTUALLY "ANTIQUATES" MOST OTHER SPACE HEATERS

A whopping 2800 cubic feet of heated air capacity per minute—positive circulation. As an example of the high output capacity, a single Waikiki would deliver enough heated air to keep three 5-room houses comfortable! . . . and multiple units multiply output—provide "spot" or overall heat distribution with important savings. Here's dependable high-volume heat output built and backed by 50 successful years of Vapor Heating Corporation heating equipment specialization.

Delivers 200,000 btu/hr—Automatically.

FOR . . . physical comfort, for curing concrete, drying paint and plaster, thawing frozen pipes, defrosting ice machines and cold rooms. For pre-heating materials to speed processing, melting ice accumulations within refrigerated trucks and trailers—and a host of other applications!

Burns Kerosene, Fuel Oils Nos. 1 and 2, Gas (Natural, Manufactured, L.P.)

Send for complete story of this completely NEW Space Heater

VAPOR HEATING CORPORATION
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Please send me Waikiki Bulletin No. 445.

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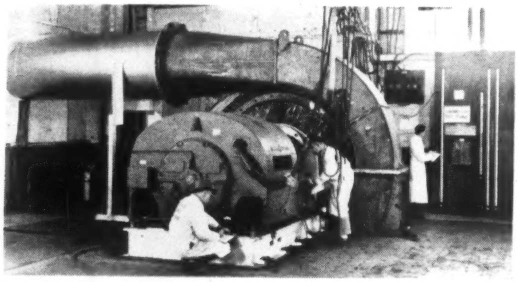
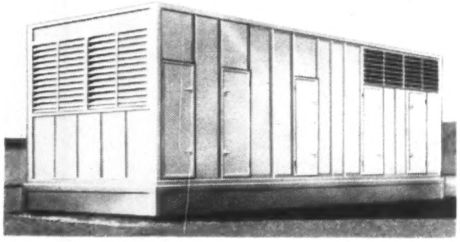


Centrifugal Compressor . . .

. . . for cyclone fired boiler use—*American Blower Corp., Dept. HPAC, Detroit 32.*

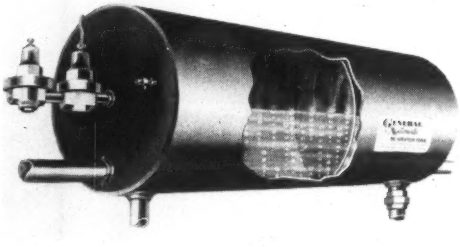
Units incorporate 48 in. intake, discharge connections designed with unobstructed diffuser passages for high efficiency operation, says company. Driven by 1000 hp, 1800 rpm squirrel cage induction motor. Rated for delivery of 78,200 cfm of air at 65.5 in. WG.



Articulated Air Conditioning Unit . . .

. . . with 60 ton capacity—*Air & Refrigeration Corp., Dept. HPAC, 439 Madison Ave., New York 22.*

System comprises controlled outside and return air mixture, filter bank, sprayed direct expansion coil unit and fan. Refrigeration compressor, receiver, evaporative condenser also enclosed in same housing.



Dual Deaerator Tanks . . .

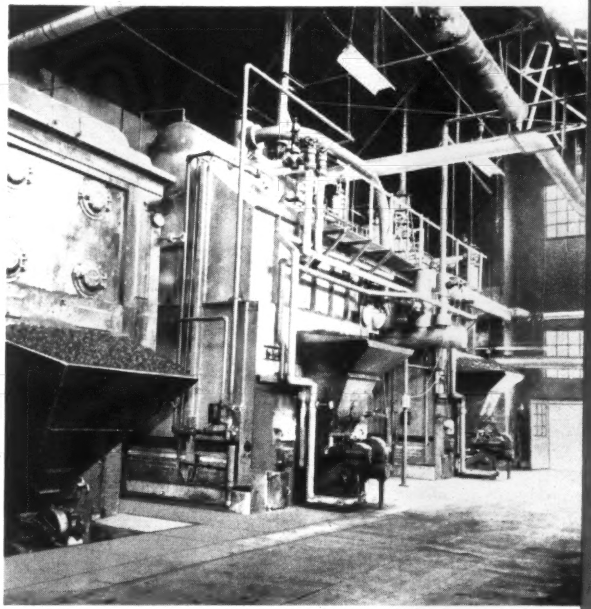
. . . for trapping and preventing air from getting into heating systems, facilitating steady flow of water at full rated capacity—*General Automatic Products Corp., Dept. HPAC, 2300 Sinclair Ln., Baltimore 13.*

Recommended by company for installation in any hot water heating system. In three sizes for 500, 1000, 1500 sq ft hot water radiation. Tappings are 1¼ in.

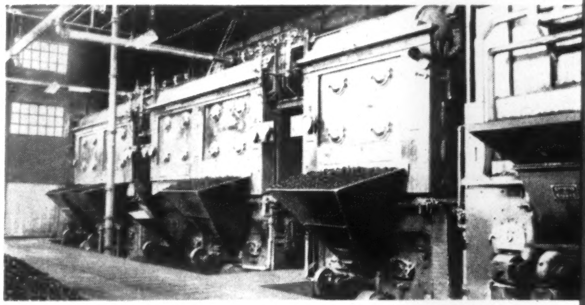
Over One Million Pounds of Tomatoes Per Year Grown in 13 Acres Under Glass

Detroit Stokers Burn 140 Carloads of Coal Per Year

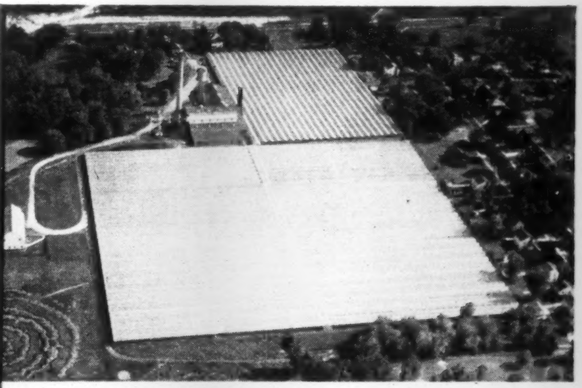
at the Wright Brothers Greenhouse Company, Toledo, Ohio.



Detroit Double Retort Underfeed Stokers installed in 1954. The J. A. Young Company, Toledo, Power Plant Contractors.



Detroit UniStokers installed in 1929.



Air view of Wright Brothers Greenhouse, Toledo, Ohio.

Thirteen acres of greenhouse take a lot of heat. And if you are growing tomatoes, a dependable heating plant is an absolute necessity as tomatoes are extremely sensitive to low temperature.

The Wright Brothers Greenhouse Company has depended on Detroit Stokers since 1929—and found them reliable.

TWO CONTRACTS

In 1929 five Detroit UniStokers with Babcock and Wilcox Stirling Boilers.

In 1954 two Detroit Double Retort Stokers with Babcock and Wilcox Type FF-15-32 Integral-Furnace Boilers.

All stokers and blowers are turbine driven.

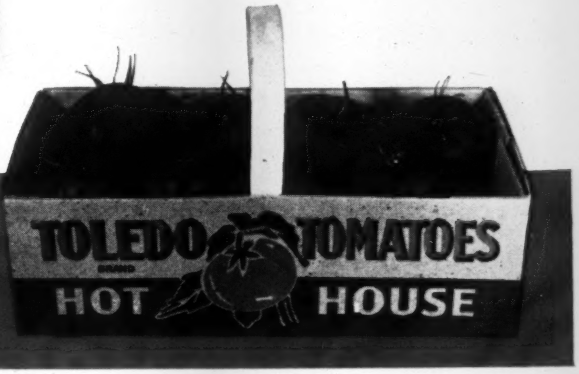
Coal is elevated to the stoker hoppers by a tractor loader. Ashes are blown into an outside overhead silo.

Steam is for heating and also for sterilizing the soil before planting.

DETROIT STOKER COMPANY

MAIN OFFICE AND WORKS—MONROE, MICHIGAN

District Offices or Representatives in Principal Cities



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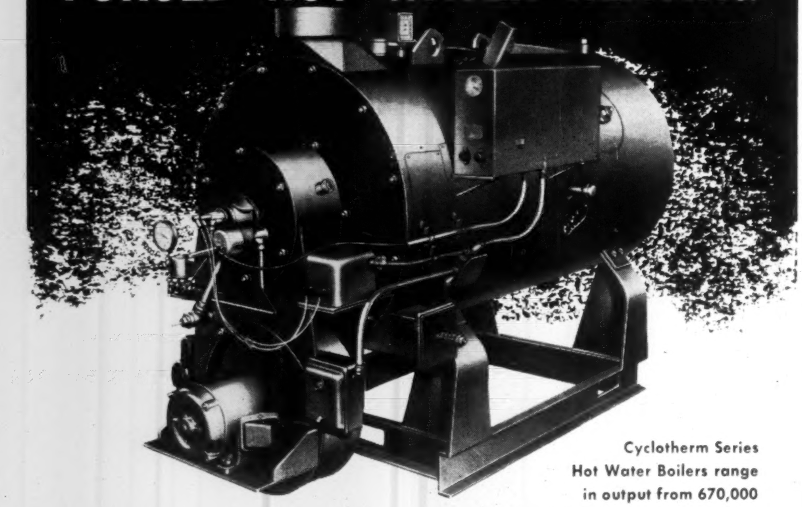
Especially engineered for
FORCED HOT WATER HEATING



Cyclotherm Series
Hot Water Boilers range
in output from 670,000
Btu to 6,700,000 Btu and from 4,467
to 44,667 sq. ft. of EDR.

Now you can get the economy and efficiency of a packaged boiler in modern hot water heating. The new Cyclotherm Hot Water Line has been designed expressly to meet the demands of complex, forced circulation heating systems. Now your heating plant can have the economy of operation, maintenance and installation . . . the versatility and space saving of a *Cyclotherm*. Here is one package boiler engineered specifically to service multiple hot water lines of varying requirements, and equipped to handle, at maximum efficiency, return lines with large temperature differentials. And Cyclotherm guarantees 80% fuel efficiency, operating at either peak demand or partial loads—with modulation controls available on most models.

By now, almost everyone knows about patented Cyclotherm Cyclonic Combustion. Injected at a tangent, high velocity air forms a swirling tube which hugs the inside wall of the combustion chamber. The fuel is introduced into the entering air, where it is slowly, but completely consumed as it moves in a cyclonic motion through the combustion chamber. This highly luminous, slow burning flame transfers, by radiation and convection, between 65 and 70% of the heat value of the fuel. At the same time, a layer of air separates the flame from the firetube to prevent hot spots and flame impingement. At the end of the firetube, the hot residual gases are deflected through the return tubes to deliver an additional 15 to 20% fuel efficiency.

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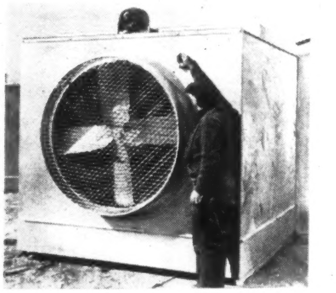
FEB 25-MAR 1, 1957

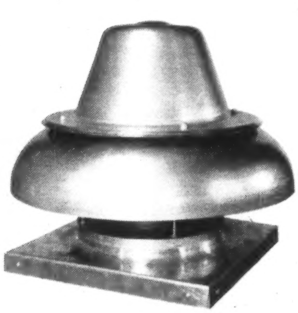
CYCLOTHERM DIVISION NATIONAL-U.S. RADIATOR CORP., OSWEGO, N.Y.



Cooling Tower . . .

. . . with side-suspended decking feature for easy basin cleaning—*Dover Mfg. Co., Dept. HPAC, 3117 Weatherford Ave., Independence, Mo.*

Recommended by company for air conditioning and refrigeration installations, and for engine jacket and compressor cooling. Suspension system is said to leave bottom of basin uncluttered for quick periodic cleaning. Horizontal induced draft unit with propeller fan and stainless steel fan shaft available in sizes 2 to 100 tons.



Power Roof Ventilator . . .

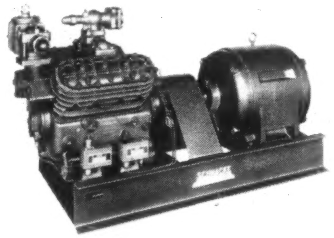
. . . with all-aluminum construction—*New York Blower Co., Dept. HPAC, 3155 S. Shields Ave., Chicago 16.*

Centrifugal "Bell-Ex" units have 6 to 22 in. backwardly inclined direct drive wheels. Rated 170 to 7400 cfm at 1/8 in. static pressure.

Air Conditioning . . .

. . . system engineered for fast installation—*Whirlpool-Seeger Corp., Dept. HPAC, St. Joseph, Mich.*

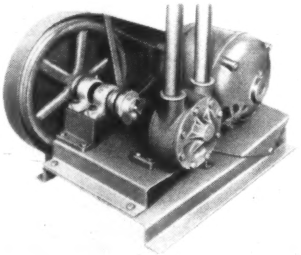
Complete installation, with necessary ductwork and outlet grilles, takes one day, says company. Available in 2, 3, 5 hp sizes. Cooling unit, condensing unit in separate cabinets may be close coupled, or condensing unit may be located at distance from cooling unit, inside or outside building as required.



Compressor . . .

. . .for uses from low temperature application of 20 hp to 60 hp air conditioning applications—*Schnacke, Inc., Dept. HPAC, 1101 N. Governor, Evansville 7, Ind.*

"Model E" designed for 1750 rpm speeds. Same unit is used for other applications by applying proper speed with belt drive at lower speeds. Cited features include single discharge and suction valve arrangement for eliminating use of manifolds.



Pump Units . . .

. . .for handling heavy fuel oils, similar liquids in heating, other applications—*Tuthill Pump Co., Dept. HPAC, 939 E. 95th St., Chicago 19.*

"SU" units recommended by company for use in industrial, commercial oil burner service. May also be used for movement of noncorrosive, highly viscous liquids with lubricating qualities. Furnished in two or four v-belt drive models for pressures to 300 psi, capacities to 2030 gph.

W-S Forged Steel Fittings

Now protected with...

new blue rustproof coating

That attractive color you see on our forged carbon steel fittings is a new synthetic coating that effectively protects the fittings against corrosion in stock and in service. The coating completely covers the fittings—inside and outside, thus protecting threads and sockets, as well as external surfaces.

If you are going to paint your piping system for color coding or other reasons, the new coating serves as an excellent base for paint. No objectionable rust or scale to scour off before painting.

All W-S forged carbon steel fittings, in both screw-end and socket-welding types, are now available with the new blue rustproof coating.

Remember the blue color. It labels the fitting a W-S Quality Product.

Send for your copy of Forged Steel Fittings Catalog A-3-56

Write to W-S Fittings Division, H. K. Porter Company, Inc., P.O. Box 95, Roselle, N. J.

HKP W-S FITTINGS DIVISION
H. K. PORTER COMPANY, INC.

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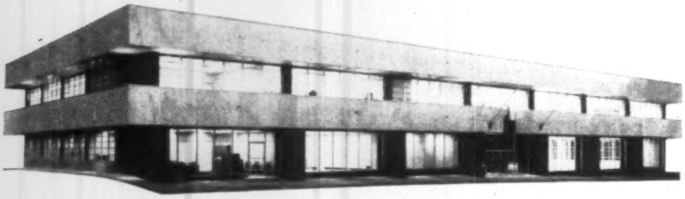
Flexible Thermaflex®

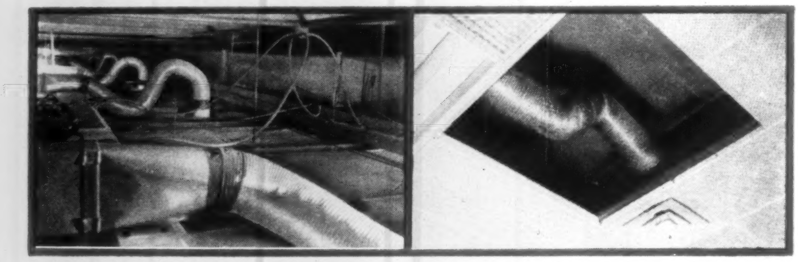
keeps floor plans flexible, too!



George L. Dahl, Architects & Engineers; O'Rourke Construction Co., General Contractor; United American Insurance Co., Owner—all of Dallas

Rigid ducting couldn't handle this job!

To allow for future rearrangement of offices, ceiling diffusers in the new Dallas Insurance Center had to be readily moveable! They are — because the architects and contractors installed flexible Thermaflex. Diffusers can be moved four feet in any direction without disconnecting Thermaflex — no complicated tearing out and refitting of rigid ducting will be needed.



You can see the flexibility assured by Thermaflex as runouts from main ducts to ceiling diffusers. This lightweight, durable, easy-to-handle metallic-laminate ducting is contributing a great deal to the usefulness of this new building over a long period of years. This installation is a conventional low pressure system. Thermaflex was used in 5", 6", 8" and 10" diameters. It is available in diameters up to 12 inches.

Laboratory tests have proved that Thermaflex will stand 1200° F. without any sign of combustion or melting — that it will stand pressure of 25 psi, which is 5x minimum standards of the New York Board of Standards and Appeals. Thermaflex bends around corners and obstructions with minimum friction loss . . . installs quickly and easily . . . eliminates costly elbows and special fittings.

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Please send me more information on Thermaflex.

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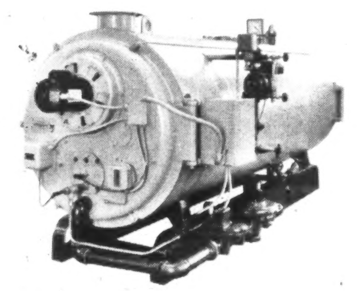
EQUIPMENT DEVELOPMENTS

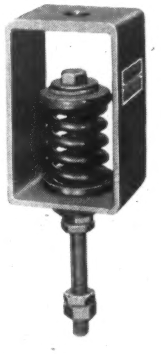
Continued



Packaged Boiler . . .

. . . for commercial heating—*Cleaver-Brooks Co., Dept. HPAC, 326 E. Keefe Ave., Milwaukee 12.*

In five sizes up to 1,340,000 Btu output. Recommended by company for commercial steam, hot water applications, units available for gas or oil firing.



Hangers . . .

. . . designed to eliminate vibration, noise from suspended equipment, piping—*Korfund Co., Inc., Dept. HPAC, 48 OIF 32nd Pl., Long Island City 1, N.Y.*

"Vibro-Hangers" utilize helical steel spring as "high deflection, high efficiency" vibration isolating medium. Springs are said to withstand high temperatures without permanent set, low temperatures without losing resilience.

Power Roof Ventilator . . .

. . . with centrifugal type design—*Clarage Fan Co., Dept. HPAC, Kalamazoo, Mich.*

"Jet-Siphon" feature is said to make unit uniquely well suited to high static pressure requirements.

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International Amphitheatre
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February 25th to March 1st
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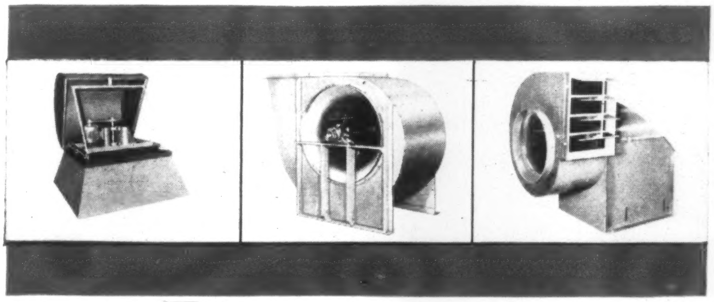

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See the NEW non-overloading
backward curved packaged
utility set (MSV-PF Blower)
Also see our non-overloading
backward curve power roof ventilator
with full venturi curved inlet cone

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The BISHOP & BABCOCK Mfg. Co.
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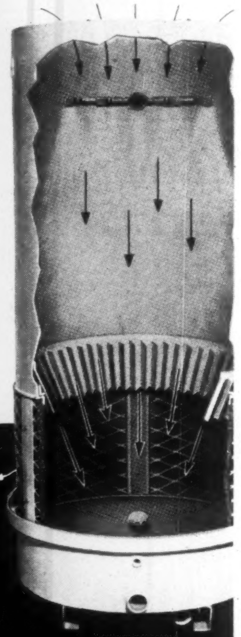
lower cost!
no moving parts!
attractive—compact!

Sizes to match all self-contained air conditioners 3 to 20 tons



AMAZINGLY SIMPLE DESIGN!
SIMPLY AMAZING PERFORMANCE!

Inlet Diffuser/ Inductor Nozzles/ Powerful Jet Action Forces Air/ 500 F P M Velocity/ Assures Intimate Contact with Water/ Self-Cleaning Dynamic Sprays/ No wood Fill/ 360° Glass Eliminator/ Plasticlad Finish Top to Bottom

a word about the manufacturer

Koch Engineering Company, as a basic oil industry equipment manufacturer for more than 30 years, is world famous for its developments in heat transfer refinery processes.
The same engineering skill that makes Koch outstanding in the oil industry has gone into the manufacture of the revolutionary Koch Jet Action Cooling Tower.

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A few areas are open for Manufacturer's Representatives. Right now... write for information or see us at the Exposition.

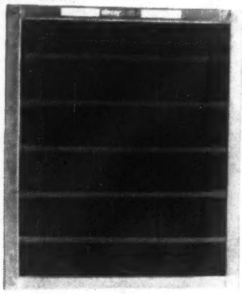
EQUIPMENT DEVELOPMENTS

Continued

Foamed Plastic Insulation . . .

. . . for pipelines in commercial or institutional heating or air conditioning systems—*Armstrong Cork Co., Dept. HPAC, Lancaster, Pa.*

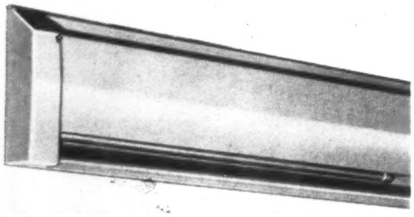
Formulated to withstand temperatures to 200 F. Can be slit longitudinally by installing contractor, cut to proper lengths, snapped onto existing pipelines.



Activated Charcoal Filter . . .

. . . formulated to remove odors, eliminate smog and air pollutants—*Barnebey-Cheney Co., Dept. HPAC, Cassady and Eighth Ave., Columbus 19, Ohio.*

Throwaway type unit is said to reduce heating, cooling costs because outside ventilation is not required. "Dacor" filter designed to be small in size, light in weight.



Baseboard Heater . . .

. . . for use either as central heating equipment or for auxiliary space heating—*International Oil Burner Co., Heating Div., Dept. HPAC, 3800 Park Ave., St. Louis.*

Electric hot water units come in lengths 4 to 10 ft. Each yields 2550 to 5800 Btu. Electrically operated, automatically controlled with wall thermostat. De-

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Over 95% of Doerr's production consists of motors with one or more special features

Rely on Doerr's long and specialized experience to solve your problems. List your specifications. Then let Doerr prove how easy it is to select and receive on-time delivery of motors that *exactly* fill your need.

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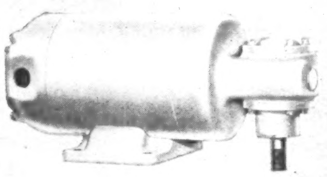
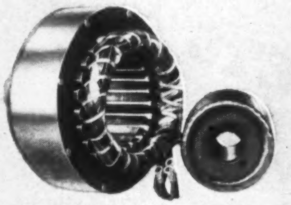
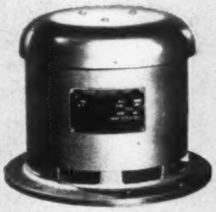
Discover now why leading machinery builders consistently re-order Doerr Motors. Before you buy, just write or call us in for a talk. More than likely we can furnish the top-quality power package you want.



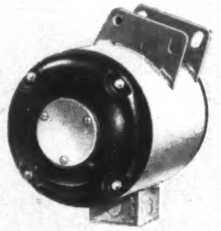
Gearmotor for agitator drive on bulk milk cooler. Stainless steel shaft. Leak-proof seal.



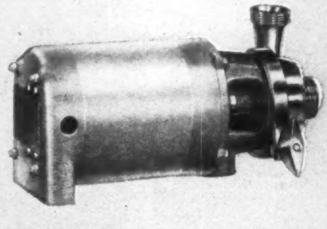
Special diameter motor parts for use in rotary oil burners. Range ½ to 5 HP.



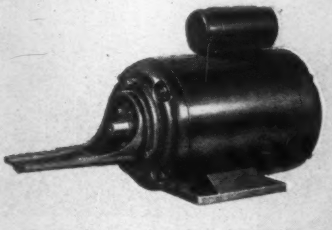
Floor machine motor. Low contour—high torques—pleasing appearance.



Doerr motor with special mounting used on leading 10" tilting arbor saw.



Sanitary dairy pump motor . . . Doerr-Designed to customer's specifications.



Special pump bracket eliminates mounting and alignment problems. Saves space and weight.

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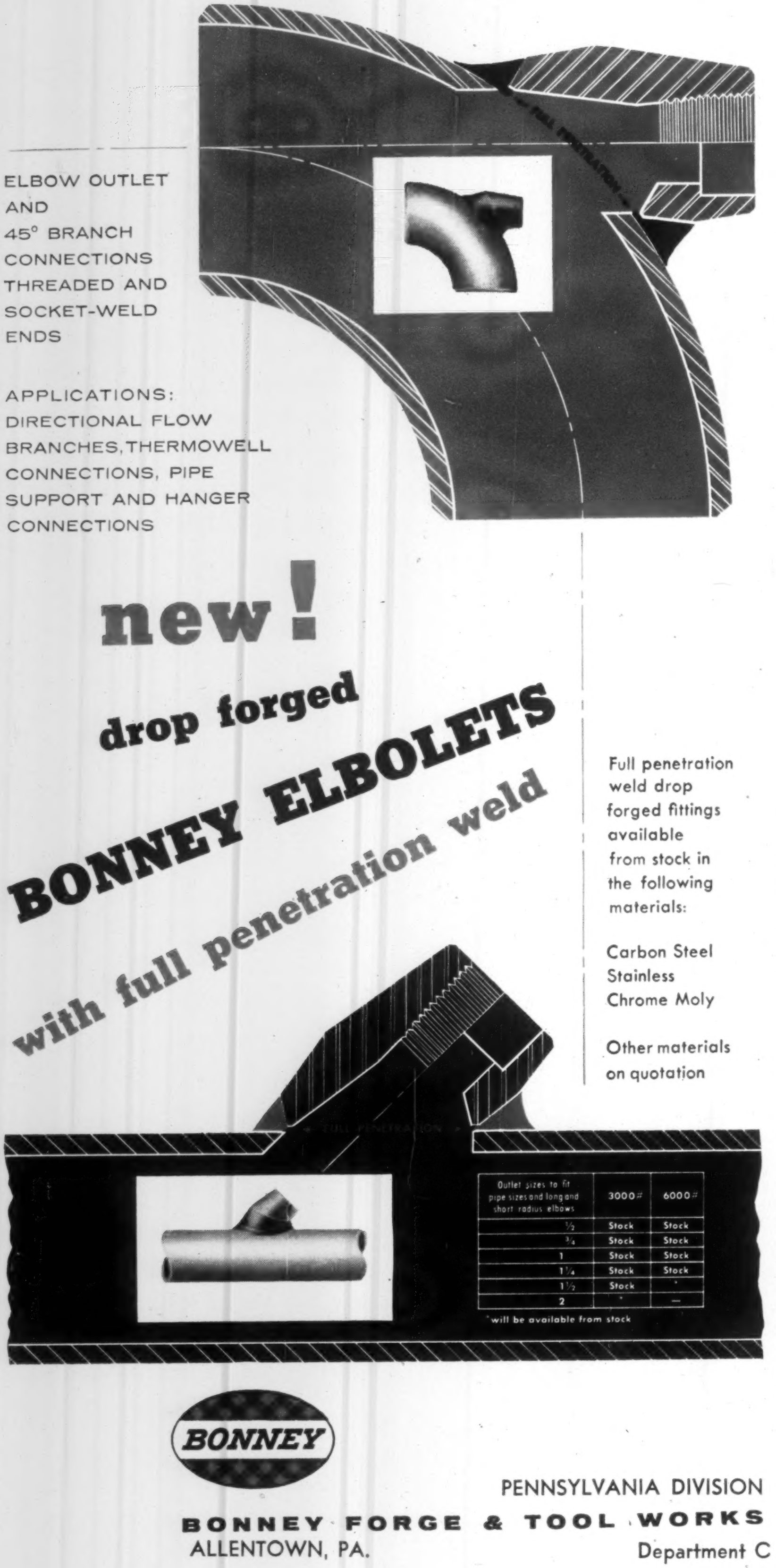

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¾	Stock	Stock
1	Stock	Stock
1¼	Stock	Stock
1½	Stock	*
2	*	—

*will be available from stock

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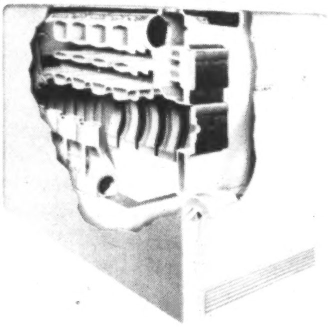
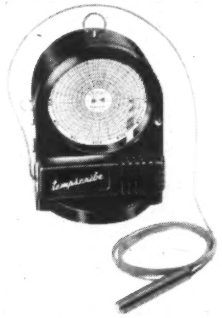
signed to have greater surface area, high heat conduction.



Oil Heating Unit . . .

. . . engineered for more efficient heat transfer by utilizing all of primary heating surfaces possible—*Weil-McLain Co., Dept. HPAC, Michigan City, Ind.*

Cited feature of "No. 72" is self regulating, turnaround flue gas travel. Involves breaking hot gases leaving combustion chamber into many small streams, each of which contacts cooler sides of fire box. In five sizes with net I-B-R ratings to 305,000 Btu per hr steam, 331,000 Btu per hr water.



Temperature Recorder . . .

. . . with bulb type element for remote temperature reading—*Bacharach Industrial Instrument Co., Dept. HPAC, 7301 Penn Ave., Pittsburgh 8.*

"Tempscribe" has temperature sensitive bulb, 6 ft of flexible capillary tubing. Two temperature ranges available: −30 to 50 F, 10 to 90 F. Other ranges can be supplied, says company. Recommended by manu-

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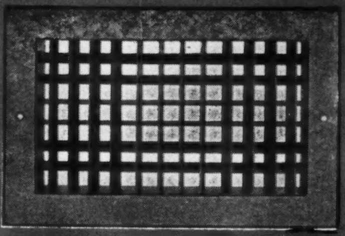
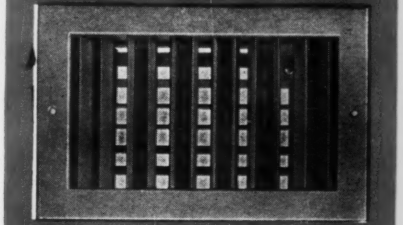
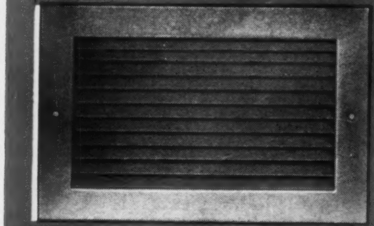
P. O. BOX 72 WATERLOO, IOWA, U. S. A.



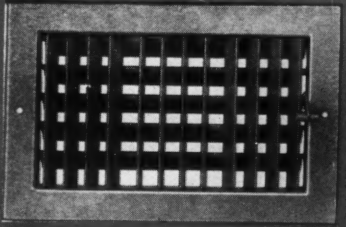
2V SUPPLY GRILLE



2VO SUPPLY REGISTER



3H RETURN AIR GRILLE



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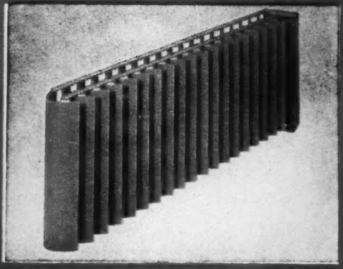


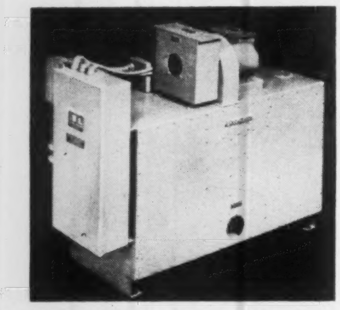
DUCTROL AIR VOLUME EXTRACTOR

DV DOOR GRILLE

EQUIPMENT DEVELOPMENTS

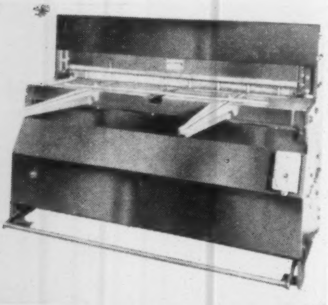
Continued

facturer for air conditioning and refrigeration service, plant and laboratory work.



Dehumidifier . . .
. . . engineered to control up to 35,000 cu ft of space—*Dryomatic Corp., Dept. HPAC, 806 N. Fairfax St., Alexandria, Va.*

Recommended by company for installation in warehouses, processing rooms, storage areas, other locations where dry atmosphere is required.

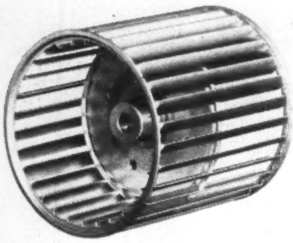


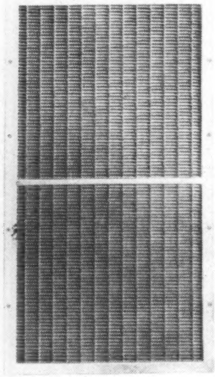
Squaring Shears . . .
. . . engineered for increased production—*Whitney Metal Tool Co., Dept. HPAC, 724 Forbes St., Rockford, Ill.*

In 3 to 6 ft sizes to handle mild steel sheets to 12 gage thickness. Cited features are four-edged blades, transparent guards, calibrated gages, improved shaft bearings.

Blower Wheels . . .
. . . with "center lock" design—*Torrington Mfg. Co., Dept. HPAC, Torrington, Conn.*

Recommended by company for commercial air conditioning, heating equipment. Center disc of center lock design is dovetailed under pressure into encircling blades, forming compression fit. As result, interlocking joint tightens during rotation, says company. Available in size with 6 5/16 in. diameter, width of 5 13/16 in.





Wall Grilles . . .
. . . for commercial installations—*Independent Register Co., Dept. HPAC, 3747 E. 93rd St., Cleveland.*

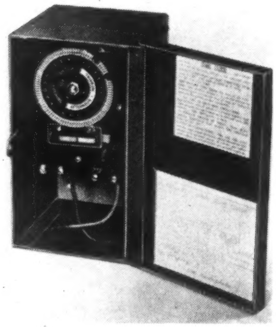
"No. 311D" custom made to order for schools, hospitals, hotels, other commercial structures. Are said to be rigid, strong, highly resistant to impact. With tamperproof design, changes in air distribution cannot be made by unauthorized persons, says company.

Swimming Pool Boiler . . .
. . . with self energizing controls that require no outside electric connections—*McIntyre Engineering Co., Inc., Dept. HPAC, 137 S. Linden Ave., South San Francisco, Calif.*

Designed to maintain constant temperature in pool, permit burners to be fired only when water is circulating through boiler. Unit is said to be "wearproof," provide positive circulation, be light in weight. Rated 250,000 Btu per hr input.

Power Roof Exhausters . . .
. . . in capacity range 300 to 6500 cfm—*Greenheck Fan & Ventilator Corp., Dept. HPAC, Schofield, Wis.*

In centrifugal, axial types. Construction is spun aluminum with motor cushioned in rubber. Recommended by company for use in industrial and commercial buildings, schools, similar structures.



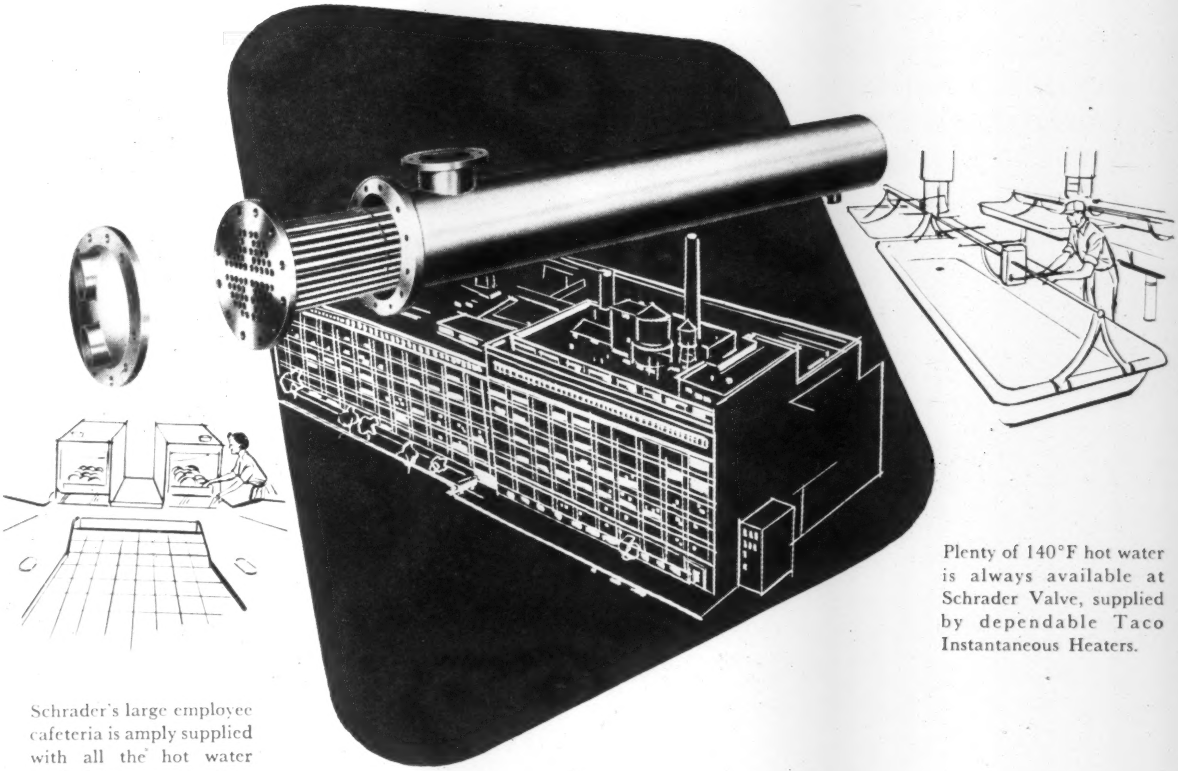
Time Switch . . .
. . . for controlling three phase power and lighting loads—*Tork Time Controls, Inc., Dept. HPAC, Mt. Vernon, N.Y.*

Three pole unit available in four dial styles: regular 24 hr, "skip-a-day," astronomic, seven-day. Most popular application, says company, for "Model 1963" is switching of three separate 120 volt circuits leading from sub-panel. Is said to be first unit that can be used to control 1½ hp, three phase motor directly.

Vibration Mountings . . .
. . . in three sizes with load range 10 to 1250 lb per mounting—*Vibration Mountings, Inc., Dept. HPAC, 98-25 50th Ave., Corona 68, N.Y.*

Recommended by company for isolation of air conditioning, refrigeration equipment foundations. Design of units utilizes reinforcing rods of foundation, making mounting integral part of concrete block.

How would you heat 100,000 Gallons of water daily?



Schrader's large employee cafeteria is amply supplied with all the hot water needed at the precise temperature desired.

Plenty of 140°F hot water is always available at Schrader Valve, supplied by dependable Taco Instantaneous Heaters.

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They use 5 Taco Instantaneous Heaters. Every day of the year these 5 Tacos heat 100,000 gallons of water with 5 lb. live steam to 140° or 180°F. All Schrader hot water requirements . . . and there are *many* . . . are amply met by rugged, trouble-free Tacos *without a major repair in 18 years.*

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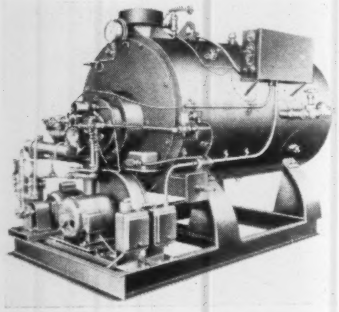
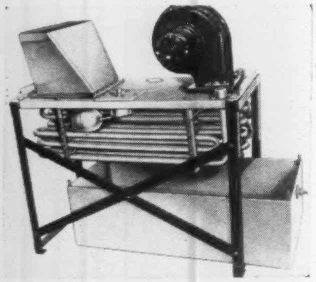


Steam Boilers . . .

. . .designed to conform to New York City code requirements—*Cyclotherm Div., National-U.S. Radiator Corp., Dept. HPAC, Oswego, N.Y.*

Rated 50 and 60 hp, units are fully automatic for unattended operation, says company. Burn No. 4 oil, light oil, gas, or combination oil or gas. Are said to have only 98 sq ft of heating surface. Cited feature of units is cyclonic combustion, which means that air is forced into firetubes at tangents at velocities to 200 mph.



Central Humidifier . . .

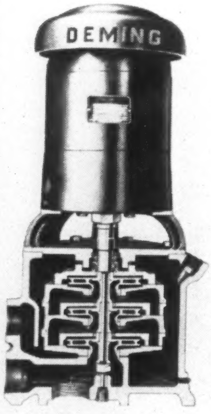
. . .for buildings with hot water, steam or warm air heating systems —*Armstrong Machine Works, Dept. HPAC, Three Rivers, Mich.*

Automatic controlled, evaporative type "Humid-i-maker" designed for offices, schools, churches, hospitals, greenhouses, other buildings. Operates by circulating air across surface of heated water and into central distribution duct. Consists of closed stainless steel tank containing submerged copper heating coils, water level control. Blower mounted on top of tank circulates air. Capacity is sufficient to handle to 33,000 cu ft, says company.

Coils . . .

. . .for use with direct expansion refrigerant or chilled water—*Drayer-Hanson, Div. of National-U.S. Radiator Corp., Dept. HPAC,* 3301 *Medford St., Los Angeles* 63.

Recommended by company for small commercial applications. Cited features include fully insulated, all aluminum drip pan; high heat transfer via copper tube, aluminum finned coil expanded to assure tight thermal bond.



Water Systems . . .

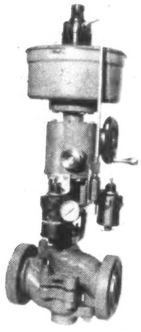
. . .line expanded to include 2, 3, 5 hp units said to deliver increased capacities from greater well depths—*Deming Co., Dept. HPAC, Salem, Ohio.*

Multistage system designed to handle large quantities of water at high pressures efficiently, economically. Consists of series of pumping stages operating as one unit. Water pressure increases as it goes through each stage. Single pipe or two pipe jets equip system for deep well service.

Cylinder Actuators . . .

. . .with handwheel operator available as integrally mounted accessory —*Conoflow Corp., Dept. HPAC,* 2100 *Arch St., Philadelphia* 3.

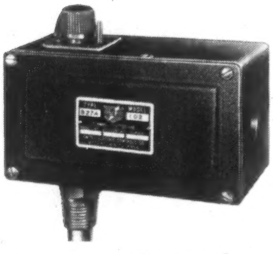
"Cono-Clutch" hand operator is said to afford immediate manual control in event of air failure. Clutching, declutching accomplished by pulling or pushing knob located on face of unit. When handwheel is in declutch position, is no interference with full, free stem travel, says company.



Cast Iron Electrode . . .

. . .for welding high phosphorous irons, for work requiring higher strength in weld area, for welding heavy sections—*All-State Welding Alloys Co., Inc., Dept. HPAC,* 249-55 *Ferris Ave., White Plains, N. Y.*

Machinable cast iron electrode features new flux coating on 55 to 60 percent nickel alloy. Applicable with a-c or d-c reverse polarity and at amperages 40 to 180. In 3/32, 1/8, 5/32, 3/16 in. sizes.



Temperature Control . . .

. . .with dual switch design that can often substitute for two separate single switch units—*United Electric Controls Co., Dept. HPAC,* 85 *School St., Watertown, Mass.*

Local mounted control has immersion element (bellows housing) placed directly into medium to be controlled. Variations in temperature converted to force which causes bellows plunger to operate switches. Models with range spans 50 or 100 F deg between limits of 30 and 400 F available.

(*Continued on page* 311)

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He handles Republic ELECTRUNITE® Stainless Steel Pipe in Type 304, 304-L, 316, 316-L, 321 and 347—plus other analyses. Continuous welded sizes from ⅛" I.P.S. through 2" I.P.S. in A.S.A. schedule 40S; from ⅛" I.P.S. through 4" I.P.S. in schedule 10S; from ½" I.P.S. through 4" I.P.S. in schedule 5S wall thickness. Larger sizes up to 30" also available. Republic Stainless Steel Tubing comes in a complete range of sizes and analyses, too.

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Williams and Co., Inc., Toledo

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A. B. Murray Co., Inc., Bristol
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TENNESSEE
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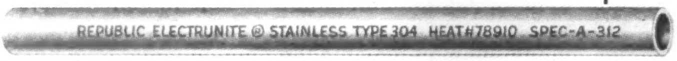
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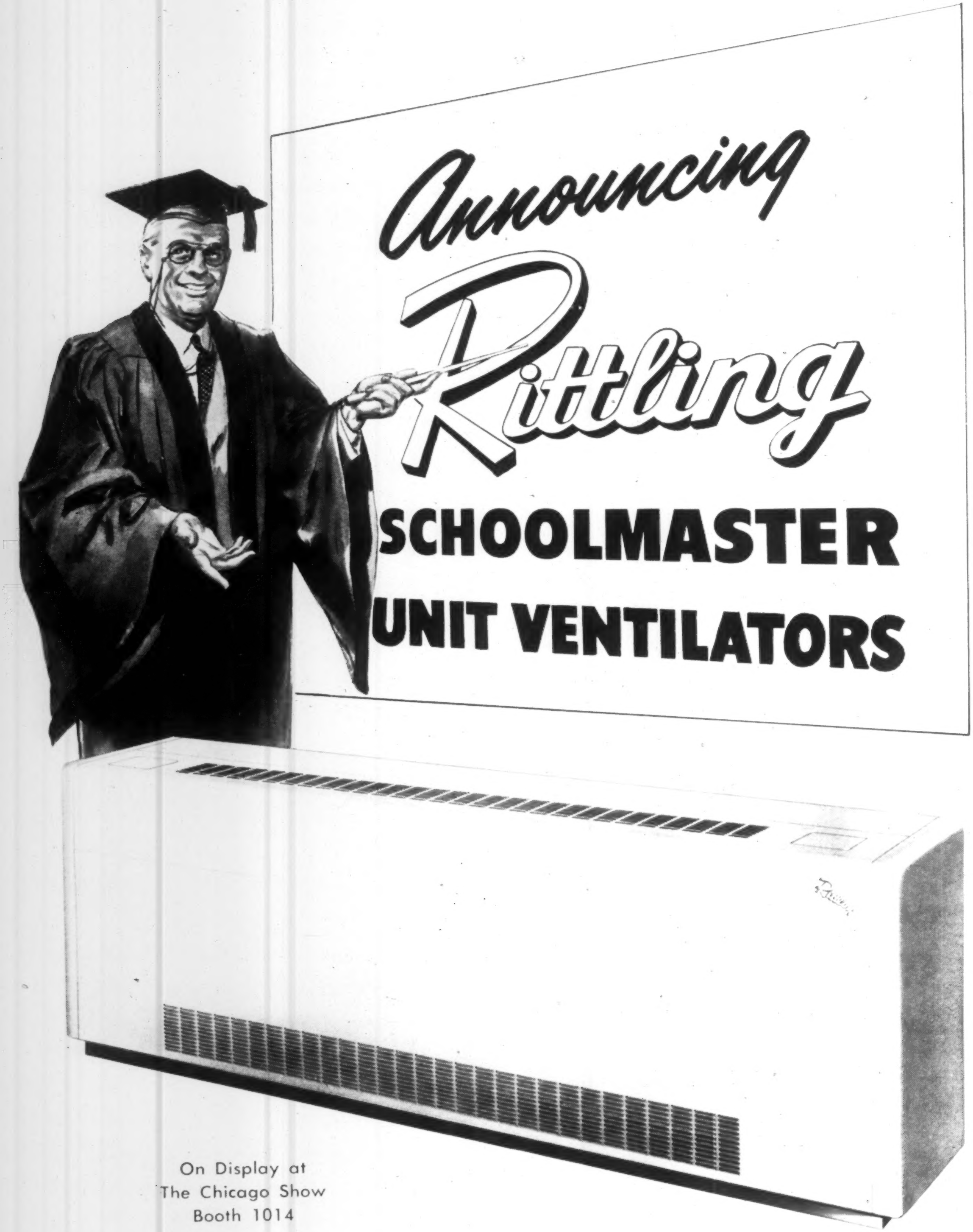
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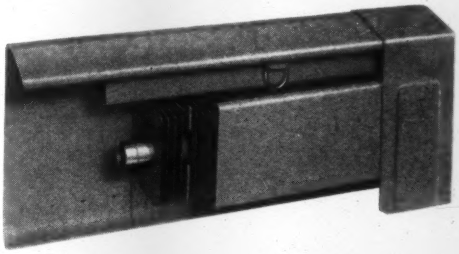
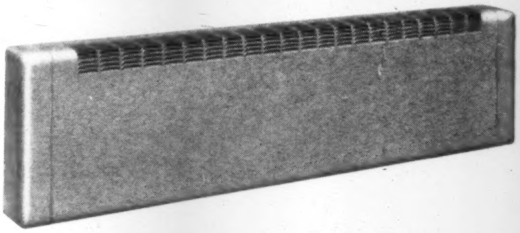
Meeting specifications for every residential, non-residential, new and remodeling job is made easy by 5 lines of RITTLING Baseboard Radiation. Low picture windows . . . long and short runs . . . household and commercial jobs . . . single and multiple housing . . . steam and hot water — RITTLING Custom and Pre-Fab Baseboard gives you the best, most economical answers.



RITTLING WALL RADIATION FOR EVERY JOB

Beautiful new 1957 smooth line RITTLING SIL-VECTOR with louvered inlet and outlet adds handsome decor to high heating efficiency whether installed above or below eye level. Other lines include sloping and flat top enclosures, — all available for 1, 2 and 3 row elements in wide range of capacities. Accessories adjustable to eliminate field measuring and cutting.

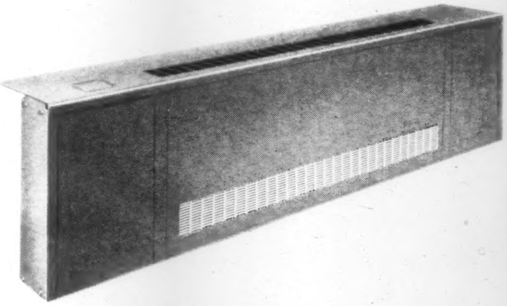


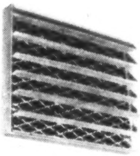
RITTLING HEATING EQUIPMENT IS DESIGNED FOR HEATING MEN BY HEATING MEN

One after another, RITTLING has introduced new FIRSTS to the industry! The complete line offers a wide selection of well co-ordinated designs and gives architects, consulting engineers, wholesalers, contractors and representatives complete, economical answers to meet every trend of residential and non-residential heating requirements. Learn why heating men enjoy doing business with RITTLING.

RITTLING SIL-TYPE CUTS BUILDING COSTS

Construction is simplified and costs of separate window stools, sills and finished walls below windows is eliminated. National attention is focused on RITTLING SIL-TYPE Units, thanks to impressive savings on multiple housing, institutions, office and many other building types. Design conditions easily met due to RITTLING tooling and production flexibility.





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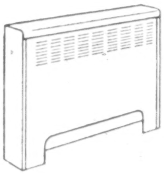
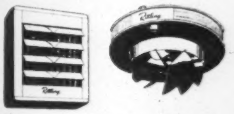
Quiet and sensitive, they prevent and cure noise and ventilating problems in schools, churches, auditoriums, theaters, hospitals and other buildings. Impregnated fabric blades end annoying metallic clatter. Fifty-eight standard sizes fit every need.



CONVECTORS AND UNIT HEATERS ROUND OUT RITTLING LINE

You will enjoy doing business with RITTLING. It will pay you to get the facts on how RITTLING products combine good design, wide selection and proven performance. Catalogs and full information are yours for the asking.



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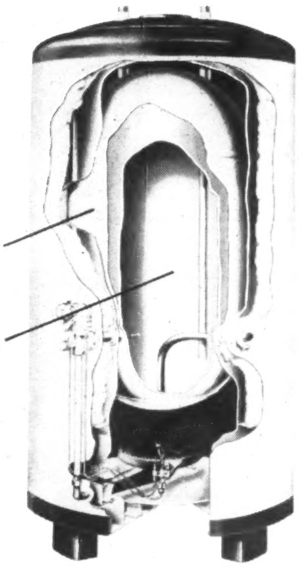
PROOF that SIL-FOS brazing assures long-lasting water-tight joints



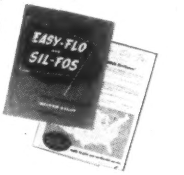
For some time now the RHEEM Manufacturing Co. have been using a SIL-FOS low-temperature silver brazing alloy in making a vital part of their revolutionary COPPERMATIC domestic water heaters – *the inner tank of pure copper.* This large tank is made of two identical halves brazed with SIL-FOS 5. The finished tanks are one of the reasons why RHEEM unhesitatingly gives a 10-year warranty on COPPERMATICS.

SIL-FOS brazing is fast!

At rear, the copper halves—each with a 3/8" turned-in flange around its edge—are accurately held in a jig and tack-brazed. Then the seam is completed as shown in foreground. Brazing per seam is 80". Two men do it in 1 minute. Inner and outer tank assemblies are hydrostatically pressure-proved at 300 lb. per sq. in.

GET THE CONVINCING SIL-FOS FACTS IN BULLETIN 20

It tells you why SIL-FOS joints are as strong, rust-proof and long-lasting as the non-ferrous metals joined—and why SIL-FOS brazing is so fast and economical. Write for a copy today. With it we'll send a list of SIL-FOS Distributors. There's one near you ready to render helpful service.



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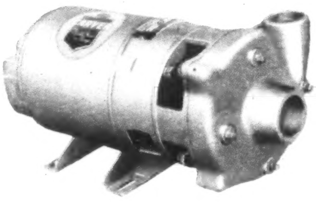

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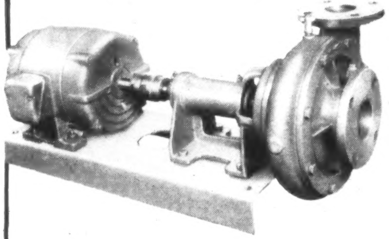

Carver *close-coupled* Electro-pumps as well as Carver *base-mounted* Pumps are available in all sizes with capacities up to 1000 G.P.M. and heads up to 240 feet.

Excellent as original equipment. Modern in design, pleasing in appearance, they add the final touch to fine equipment.

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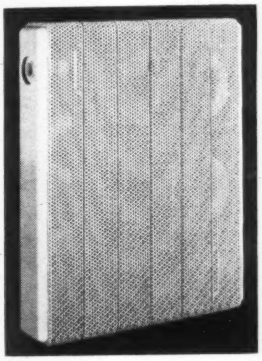
CARVER
the quality name in pumps

EQUIPMENT DEVELOPMENTS

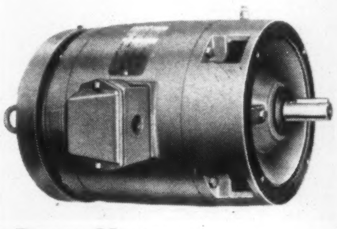
Continued from page 306



Heating Radiator . . .

. . . specially designed for mental and penal institutions—*Shaw-Perkins Mfg. Co., Dept. HPAC*, 201 *E. Carson St., Pittsburgh* 19.

With box type housing of heavy, closely perforated steel which covers interior construction to prevent tampering, insertion of foreign matter. Entire assembly—housing, heating fins, copper tubing—permanently bonded together to form one-piece unit, says company.



P-Base Motors . . .

. . . for vertical pump installation—*Reliance Electric and Engineering Co., Dept. HPAC*, 1088 *Ivanhoe Rd., Cleveland* 10.

Vertical solid shaft units have normal thrust bearings in sizes 1 to 40 hp, high thrust in sizes 1 to 15 hp. Available in protected, totally enclosed, or explosionproof enclosures. Designed for indoor, outdoor installation.

Controls . . .

. . . for air conditioning, refrigeration —*Ranco, Inc., Dept. HPAC*, 601 *W. Fifth Ave., Columbus, Ohio.*

Cited features include higher electrical ratings, superior range, differ-

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Its aerodynamically designed blades reduce noise level 65%, cut horse power requirements 35%. Capacities, 600 to 1,000,000 cfm.

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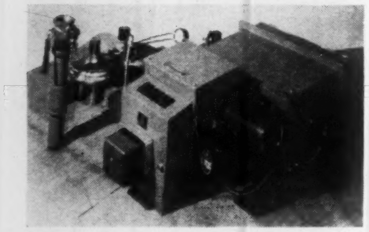
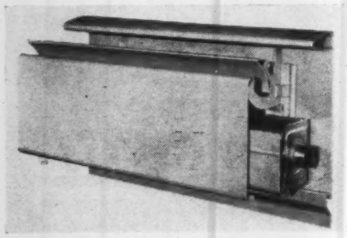
ential adjustability. Series offers models including low pressure, high pressure, temperature types. All equipped with single pole, double throw switches designed to open or close on rise of temperature or pressure.



Combustion Unit . . .

. . . designed to offer new concept in gas-oil burning—*Gordon-Piatt, Inc., Dept. HPAC, P.O. Box 914, Winfield, Kan.*

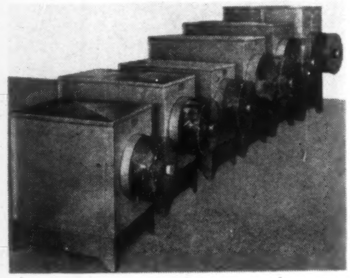
Cited feature is unique method of exchanging fuels said to permit independent air adjustments for optimum results on either oil or gas. Fuel transfer is possible at any time during or between operating cycles, says company. For natural gas, light fuel oil. In three sizes with capacities 10, 20, 30 gph of oil.



Baseboard . . .

. . . measuring 8 in. high—*Kritzer Radiant Coils, Inc., Dept. HPAC, 2901 Lawrence Ave., Chicago 25.*

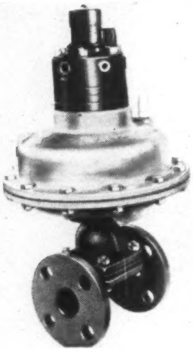
Cited features include snap-in brackets, sliding shoes and snap-on accessories, including inside corners, joint covers and wall strips. Packaged in 4, 5, 8 ft lengths. Has finger-tip controlled damper and air splitter vane for maximum heating efficiency, says company.



Water Cooling Towers . . .

. . . of induced draft type—*Silvercraft, Inc., Dept. HPAC, 130 S. Floyd St., Louisville 1.*

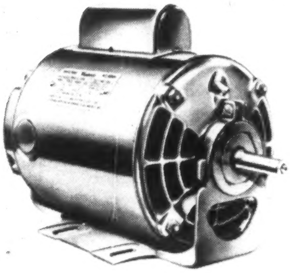
Units incorporate use of lightweight aluminum and modern coatings plus conveniently located piping and electrical connections, says company. Motor, fan blade and guard assembled into single power units.



Control Valve . . .

. . . for water treating, chemical, process industries—*Uniflow Valve Corp., Dept. HPAC, Cranford, N.J.*

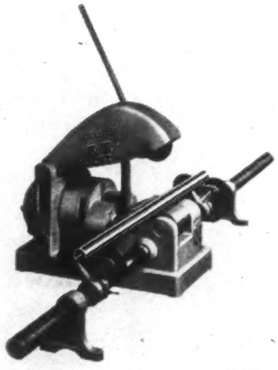
Cited features of air operated unit: no stem packing or stuffing box; tight shutoff; no clogging or sticking. Available with optional features such as handwheel type limit stops, plastic position indicators, microswitch attachments for actuating remote visible or audible signals. In sizes ½ to 6 in. for *on-off* throttling control.



FHp Motor . . .

. . . in 48 frame model—*Wagner Electric Corp., Dept. HPAC, 6400 Plymouth Ave., St. Louis 14.*

Available with either resilient or rigid base, in capacitor-start or split-phase types. Capacitor-start unit available in 1/6 or 1/4 hp model: split-phase unit rated 1/6, 1/4 or 1/3 hp.



Pipe, Tube Cutter . . .

. . . available with phenolic rollers for cutting of painted, anodyzed, chrome or plastic tubing without marring—*Collins Machinery Corp., Dept. HPAC, 5474 Alhambra Ave., Los Angeles 32.*

"E-Z Cutter's" rollers power driven to insure fast, clean cuts, says company. Are said to revolve around tubing so that cutting is continuous, slippage is eliminated. Handles tubing ⅝ to 3 in. diameter.

Electric Actuator . . .

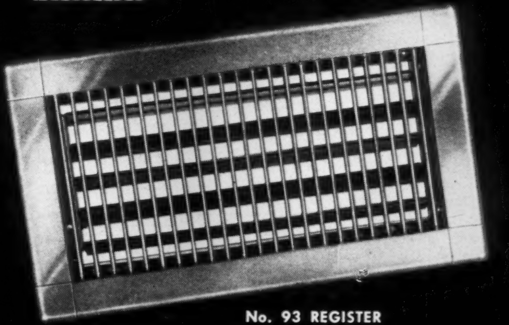
. . . for use in conjunction with electronic control systems—*Conoflow Corp., Dept. HPAC, 2100 Arch St., Philadelphia 3.*

"All-Electric" proportional posi-

H&C TRIPL-AIRE®

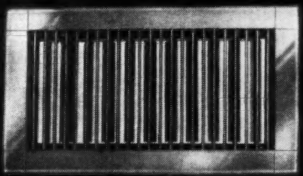
H&C FIXT-AIRE®

No. 92VHV
MULTI-DEFLECTION REGISTER
vertical face bars, horizontal secondary bars, vertical louvers. Also available without valve — No. 92VHO.

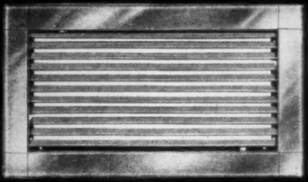


No. 93 REGISTER
Vertical front bars set straight, horizontal louvers.

No. 92VOV — SINGLE DEFLECTION REGISTER with vertical face bars and louvers. Also available without valve — No. 92VOO.



No. 92A GRILLE . . . horizontal face bars set at 22° angle for up or down deflection.



PRODUCTS OF THE WORLD'S LARGEST MANUFACTURERS OF REGISTERS, GRILLES and DIFFUSERS . . .

We have no desire to brag of mere bigness. But we do want you to know that H&C TRIPL-AIRE and FIXT-AIRE registers and grilles, introduced for commercial type installations only about a year ago, were designed, engineered and are constructed by the organization which since the turn of the century has been the leading register manufacturer. Hence you can be sure of getting the best that registers and grilles can contribute to a thoroughly satisfactory air conditioning system by specifying H&C.

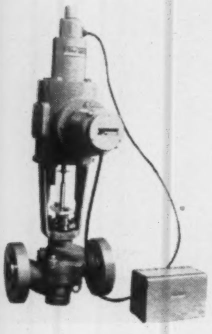
There are 26 standard sizes providing 260 possible horizontal and vertical deflection combinations . . . plus a wide range of intermediate sizes. Consequently, there's never a need to compromise . . . the EXACT deflection is always available to you. Other salient features include: Front adjustments for control of face bars and louvers; opposed louvers which permit absolute volume control with equal distribution over the entire face; "Decorator Gray" enamel finish and prompt deliveries.

CONVENIENT CATALOG GIVES COMPLETE DETAILS AND ENGINEERING DATA. Available from H&C jobbers or direct from us.

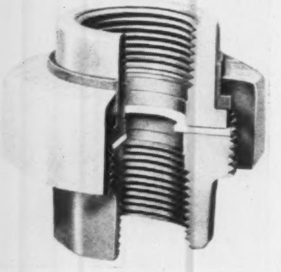
WORLD'S LARGEST PRODUCERS OF REGISTERS and GRILLES

HART & COOLEY MANUFACTURING CO.
2-AC E. EIGHTH ST.
HOLLAND, MICHIGAN

IN CANADA: HART & COOLEY MANUFACTURING CO., FORT ERIE, ONTARIO



tioning device requires no intermediate pneumatic or hydraulic operating fluids, says company. Recommended by manufacturer for application on valves, other processing equipment.



Insulating Union . . .

. . . for prevention of electrolytic corrosion due to flow of electric current along pipe lines—*W-S Fittings Div., H. K. Porter Co., Inc., Dept. HPAC, Roselle, N. J.*

Forged steel units manufactured in 3000 lb class. Sizes range ¼ to 3 in. in screw end and socket welding types. Insulating sleeve is made of fabric reinforced phenolic resin. Gasket is "Teflon."

"Job-Built" Boiler . . .

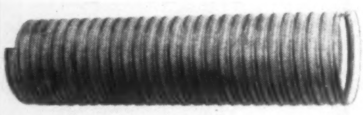
. . . designed for easy installation in existing boiler room—*Kewanee Boiler Div., American Radiator & Standard Sanitary Corp., Dept. HPAC, 101 Franklin St., Kewanee, Ill.*

Boiler is shipped to job site in sections small enough to pass through average sized door, says company.

Space Heaters . . .

. . . engineered for economic heating in plants, shops, garages, stores, poorly insulated buildings where ordinary heating is costly—*Vapor Heating Corp., Dept. HPAC, 80 E. Jackson Blvd., Chicago 4.*

"Waikiki" is said to provide 2800 cfm of heated air, direct or through ducts. Delivers 200,000 Btu per hr. Burns most fuels, says company. For installation vertically or horizontally on floor, shelf, balcony; has provision for hanging.



Flexible Duct . . .

. . . engineered to fill need for duct to handle corrosive fumes—*Wiremold Co., Dept. HPAC, Hartford 10, Conn.*

Rugged construction is said to resist fumes which may arise from chemical processes. Bends 90 to 100 deg. Has good air flow characteristics, says company.

Oil Burners . . .

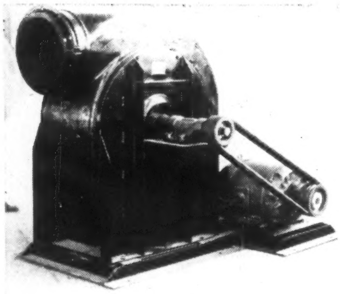
. . . with newly designed combustion head—*Eckhart Mfg. Co., Inc., Dept. HPAC, 931 Lehigh Ave., Union, N.J.*

With three external air adjustments. Capacities are 0.75 to 1.65 gph, 1.65 to 3.0 gph. Units are said to have increased combustion efficiency, affording appreciable savings in fuel oil costs, says company.

Air Cleaners . . .

. . . for use with small commercial heating, air conditioning units—*Trion, Inc., Dept. HPAC, 1000 Island Ave., McKees Rocks, Pa.*

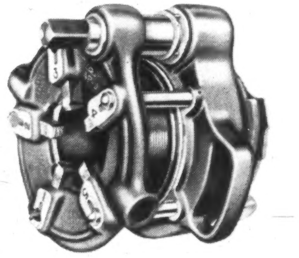
Line of electronic units also includes two models for vertical air flow, thus giving greater flexibility to installer, says company. Cited feature is remotely located power pack which is wall mounted for instrument reading, switch operation. Installed in return air duct of air conditioning or warm air heating system.



Fans . . .

. . . for high concentrations of most acids, caustic or alkaline, reasonably high temperatures—*Champion Blower & Forge Co., Dept. HPAC, Lancaster, Pa.*

Are said to have long service life, require very little maintenance. Made in variety of sizes in two types. With special acid resisting coating manufactured by *Haveg Industries, Inc., Newark, Del.*



Geared Pipe Threader . . .

. . . equipped with automatic drive kick-out designed to make it jamproof—*Ridge Tool Co., Dept. HPAC, Elyria, Ohio.*

Makes threading with power drives as safe as by hand, says company. After each standard length thread is cut, drive pinion kicks out automatically. Is said to eliminate possibility of damage to equipment, danger to personnel.

Tube Working Tools . . .

. . . for flaring, bending, cutting, swedging—*Wilson Mfg. Co., Dept. HPAC, 787 S. Barksdale St., Memphis 4.*

"Stratoflair" feature, formed by new relief at bottom of chamfer in clamping die, engineered to assure

(*Continued on page 320*)

Air Conditioning, Ordering, Installing, Maintaining — Now Made Easier For You . . .

SATISFABRICATED
by
GOVERNAIR
SCU

Yes! SATISFABRICATED! ©

It's our way of telling the world that Governair Products are guaranteed to satisfy the widest range, the most exacting capacities, and the most truly unusual space requirements.

Governair offers a SPECIAL saving of time and trouble with its complete line of Self-Contained Units. They're easier to order, since you specify only one unit in place of picking several components. Easier to install, too, since they are delivered fully tested and ready to operate with simple electrical, water and duct connections.

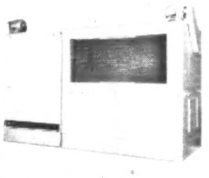
Best of all, Governair's quality engineering and construction assure you of lower cost maintenance so important to the purchaser.

WRITE OR CALL FOR DETAILED INFORMATION.

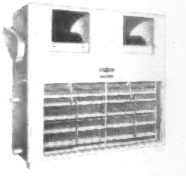
GOVERNAIR CORPORATION
4840 NORTH SEWELL
OKLAHOMA CITY, OKLA.

GOVERNAIR

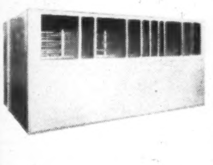
SELF CONTAINED AIR CONDITIONERS



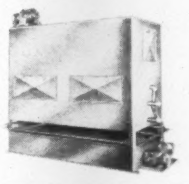
FAN & COIL UNITS



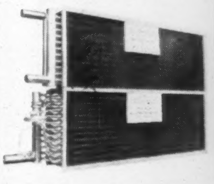
MULTI-ZONE FAN & COIL UNITS

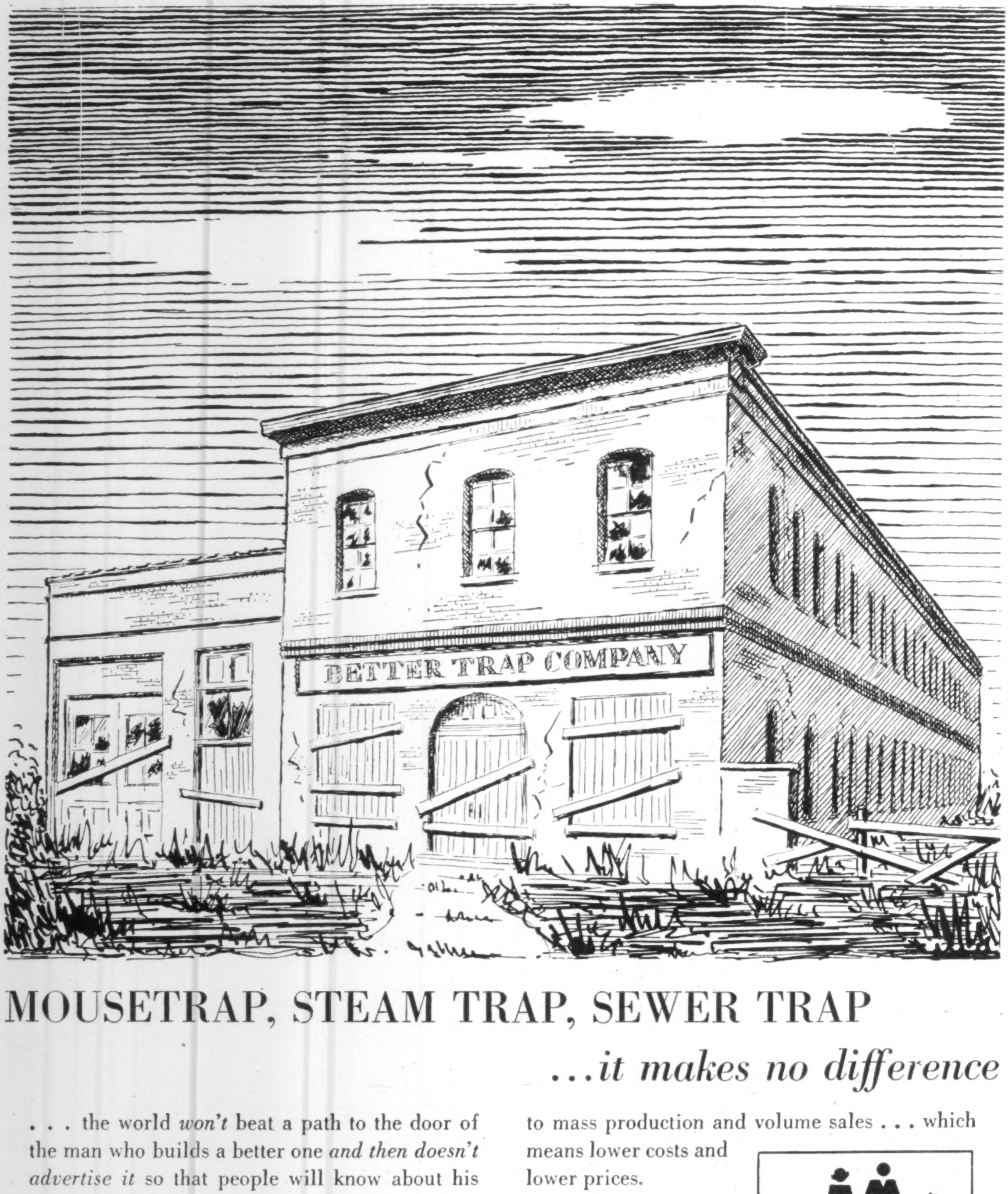


EVAPORATIVE CONDENSER



COILS HEATING & COOLING





MOUSETRAP, STEAM TRAP, SEWER TRAP

...it makes no difference

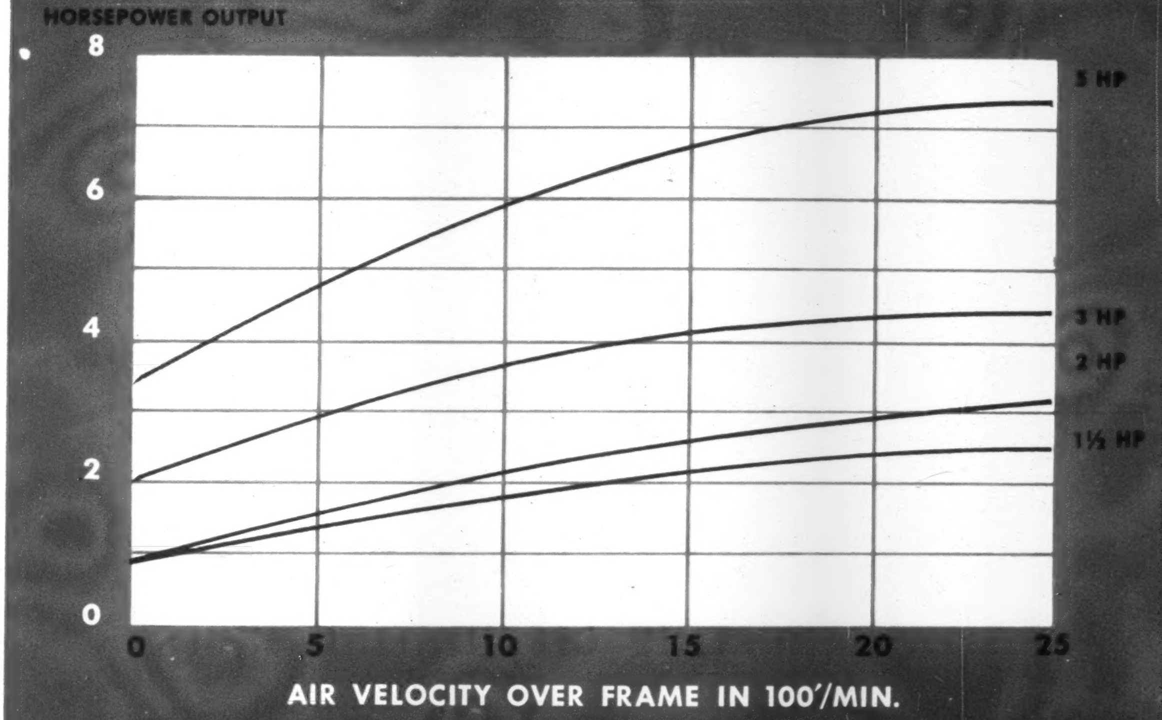
. . . the world *won't* beat a path to the door of the man who builds a better one *and then doesn't advertise it* so that people will know about his product, know where it can be bought and how much it costs.

Advertising benefits the buyer, too. It tells you the product story, makes it easy for you to buy. Even more important to you, advertising leads to mass production and volume sales . . . which means lower costs and lower prices.

Yes, "Advertising Benefits You" . . . 'specially business-paper advertising.

YES ADVERTISING BENEFITS YOU!

HEATING, PIPING & AIR CONDITIONING



SAVE 15% AND MORE ON FAN MOTORS

You can get as much as 50% more horsepower at no extra cost by using Reliance Air-Over Motors to drive fans and ventilators.

Reliance has developed a new line of totally-enclosed motors for fan service. These motors produce more horsepower when mounted in the air stream of the driven fan. Reliance Air-Over Motors will develop as much as 50% more than rated horsepower by utilizing the cooling effect of the fan's air flow.

These new Reliance Motors will save you money. By purchasing a lower horsepower rating you can save more than 15% and still meet job specifications.

Reliance Air-Over Motors are available from ½ through 40 horsepower—720, 900, 1200, 1800, or 3600 rpm. Common horsepower ratings are available from stock.

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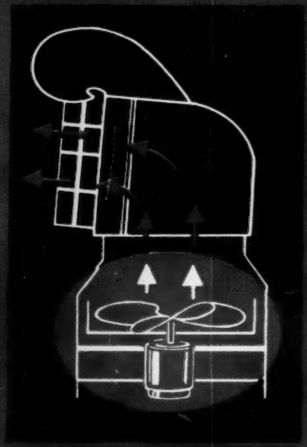


RELIANCE R ELECTRIC
AND ENGINEERING CO.
DEPT. 362A, CLEVELAND 17, OHIO • CANADIAN DIVISION: WELLAND, ONTARIO
Sales Offices and Distributors in Principal Cities

Mark of Integrity

...in reporting circulation facts

We display the Audit Bureau of Circulations* symbol with pride! It's our mark of circulation integrity!

The seasoned marketing man finds trustworthy data vital in his work of advertising media evaluation. And *reliable net paid circulation figures* are among the most valuable facts he uses in selecting printed media for his advertising campaigns.

Once every advertiser guessed about circulation accuracy and gambled on advertising results; today he need not question the wealth of data in any A.B.C. audit report, for it contains only *verified* answers to his most searching circulation queries.

* * *

*The Audit Bureau of Circulations, founded in 1914, is a cooperative, nonprofit association of the leading buyers and sellers of advertising space. A.B.C. sets standards for net paid circulation, audits and reports circulation facts. **To be sure of what your print media dollar buys—look for the A.B.C. symbol.**

When a media director or advertiser asks us, "How much paid circulation? What do your readers pay? Where does your circulation go? How do you get circulation—your audience for my advertising?", we need only show him our latest A.B.C. audit report. There he finds factual answers that annually pass the test of a trained A.B.C. circulation auditor's scrutiny.

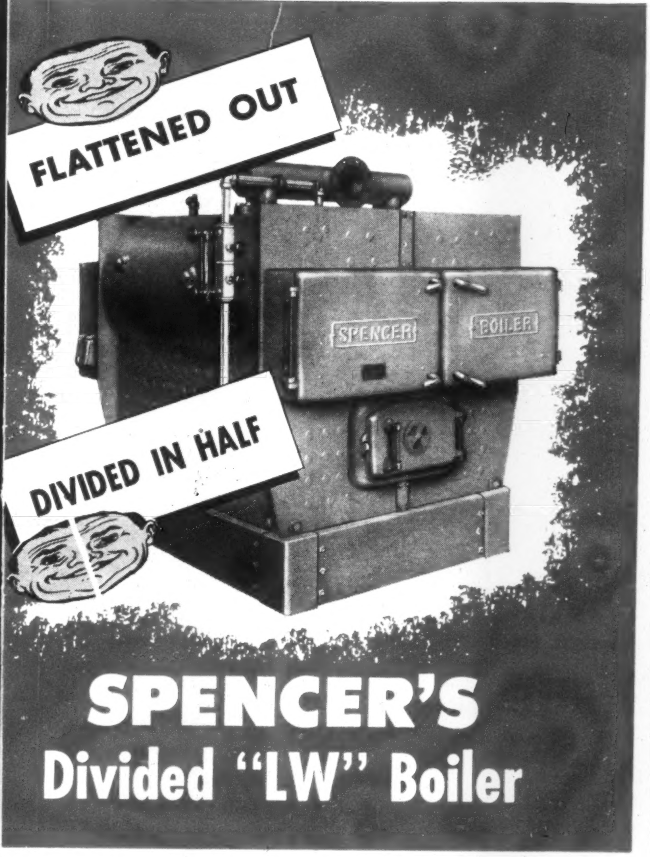
And any buyer of space can decide for himself, with confidence, the value of our circulation audience. Our A.B.C. membership means circulation reported in accordance with recognized, impartial standards, established by buyers and sellers of space working together in A.B.C.

Publishers who meet the Bureau's high standards know the A.B.C. symbol as a mark of circulation integrity. The value-wise advertiser, too, has learned that *the A.B.C. symbol is his dependable guide to the audited facts* about net paid circulation that protect his advertising investments.

Heating, Piping & Air Conditioning

MEASURE OF SERVICE...MARK OF INTEGRITY

SOLVE major heating problems with advanced SPENCER designs!



SPENCER'S
Divided "LW" Boiler

FAST HEATING
COMPACT DESIGN

SPENCER'S
"A" Boiler

Unique Low-Waterline "LW" solves installation problems

Divided in half . . . can be moved, one watertight section at a time, through narrow openings.

25% lower than conventional boilers of same capacity. Solves low headroom problems in existing buildings . . . excavation problems in new buildings. Traditional Spencer efficiency can be adapted to any fuel . . . mechanical or hand firing.

SIZES:
ranging from 3,500 to 42,500 sq. ft. steam

Durable Spencer "A" cuts installation time . . . provides economical heat

Unique flue-and smoke-boxes save hours in installation time; compact design saves valuable floor space—takes less headroom. Special peaked firebox and staggered boiler tubes provide faster heating . . . more efficient heat transfer; available for stoker or hand firing . . . can be adapted to any fuel.

SIZES:
ranging from 3,500 to 42,500 sq. ft. steam

See the unique "LW" and other fine Spencer boilers at
BOOTH 639-641
International Heating & Air-Conditioning Exposition
International Amphitheatre, Chicago
Feb. 25—Mar. 1, 1957

SPENCER
HEATER
LYCOMING DIVISION
WILLIAMSPORT AVCO PENNSYLVANIA

You can't block
EXPANSION
in heating systems . . .

SO CONNECTIONS MUST COMPENSATE

That's why Packless® is first and foremost in the design, engineering and manufacture of seamless metal flexible hose that

- ABSORBS EXPANSION
- CONTROLS VIBRATION AND PIPE TRAVEL
- DAMPENS NOISE
- CORRECTS MISALIGNMENT
- PREVENTS PIPE DAMAGE

A complete line of standard connectors, in sizes from ¼″ to 4″ I.P.S. are available for immediate delivery. Engineering service for *your* specific requirements is offered at no extra cost.

Call or write now for special technical bulletins or further detailed information. Please give us a general idea of your problem so that we may be of greater assistance to you.

Distributors and Representatives wanted: Some territories still open

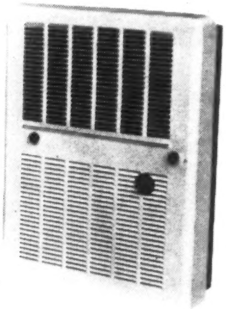
This is what expansion and contraction can do to your piping systems if rigid pipe is used throughout.

PACKLESS
METAL HOSE INC. 730-12 South Columbus Ave., New Rochelle, N.Y.

EQUIPMENT DEVELOPMENTS

From page 314

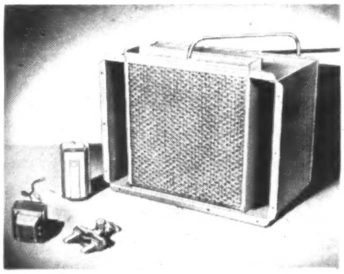
stronger flares. Permits no thinning of flares, no scoring at neck, says company. Tube cutters have dual thrust alignment ball bearing feed mechanism designed for minimum friction. Units available in variety of sizes, types.



Heating, Cooling Unit . . .

. . . for year 'round air conditioning —*Ejay Baseboard Mfg. Co., Dept. HPAC, 124 Boyd St., Winsted, Conn.*

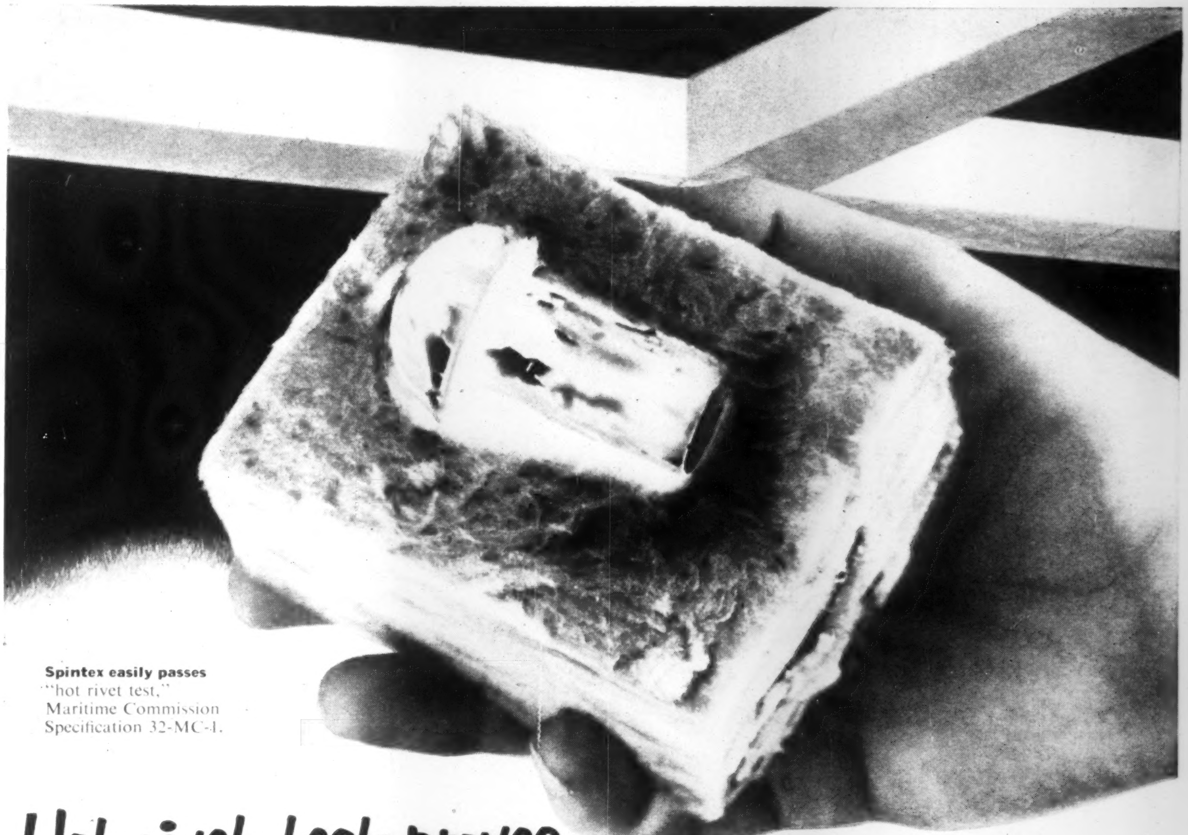
Cited feature is nonmetallic cabinet said to eliminate condensate troubles, be completely insulated and waterproof. Remote type unit has following heat transfer ratings: heating—11,400 Btu per hr at 175 cfm with entering air at 70 F with 2 gpm of 180 F water; cooling—4800 Btu per hr at 175 cfm with entering air at 80 F dry bulb, 67 F wet bulb, with 2 gpm of water at 45 F.



Humidifier . . .

. . . with automatic electric design—*Research Products Corp., Dept. HPAC, 1015 E. Washington Ave., Madison, Wis.*

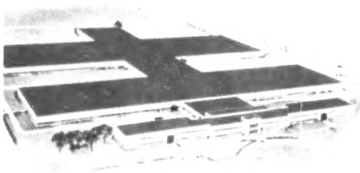
Is said by company to provide controlled humidity—as needed and only



Spintex easily passes
"hot rivet test,"
Maritime Commission
Specification 32-MC-1.

Hot rivet test proves

J-M Spintex duct insulation offers unsurpassed fire safety!



IBM uses Spintex for 205,000 sq. ft. of duct! New 781,000-sq. ft. IBM plant, Kingston, N. Y., is fully temperature-conditioned for more efficient production of electric typewriters and electronic computers.

Architects: Giffels and Vallet, Inc., L. Rossetti Assoc., Detroit, Michigan.

Spintex offers the fire-stopping advantages duct insulation must have! It will neither burn nor smoulder, and fire simply will not travel along a Spintex insulated duct.

Produced by a new Johns-Manville spinning process = new Spintex® is greatly improved. Its mineral fibres are measurably smaller in diameter and substantially more uniform. This improved fibrous structure adds countless heat-stopping dead-air spaces to every cubic inch . . . helps you maintain comfortable working temperatures at lower operating cost than ever before.

Spintex installs quickly . . . easily!

Spintex is clean, sanitary and "friendly" to handle and work with. It cuts readily with an ordinary knife. And it is easily and quickly installed even where ducts are curved or in difficult-to-reach places.

Spintex improves duct appearance in plant or office

Air conditioning ducts insulated with Spintex are neat and attractive, with trim, tidy joints. To meet unusual conditions or decorative needs Spintex is regularly furnished in a variety of special surfacings.

* * *

For more information and samples, contact your nearby Johns-Manville sales office. Or write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville *first-in* **INSULATION**
MATERIALS · ENGINEERING · APPLICATION

How to use the
REMINGTON
STUD DRIVER
FASTENING METHOD

California contractor estimates:

Time and labor costs cut 75% with the Remington Stud Driver

Out on the California coast, "Research House for '56" is taking shape. It's an experimental house sponsored by Associated Architectural Publications and the latest tools are being used to build it—such as the Remington Stud Driver.

Contractor Bert Pickney says, "The Stud Driver cuts time and labor costs around 75% in anchoring beam supports, partition sills and furring to concrete. It took us only half a day to install the sills—a 2-day job with bolts. No pre-drilling and sills set tight! I certainly recommend the Stud Driver to any contractor!"

YOU CAN SPEED ALL STUD FASTENINGS—light, medium and heavy-duty—with the Remington Stud Driver. It sets *both* 1/4" and 3/8" diameter studs in steel or concrete—up to 6 studs a minute either size. The tool is cartridge-powered, portable, ready to work *anywhere*. Forty styles and lengths of Remington Studs to choose from. Get full details by mailing coupon.

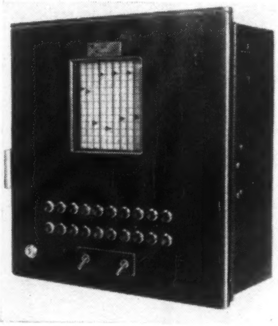
Remington
DU PONT
STUD DRIVER

Industrial Sales Division, Dept. H-2
Remington Arms Company, Inc.
Bridgeport 2, Conn.

Please send me your free booklet which shows how I can speed the job and save with the Stud Driver.

*Name*__________ *Position*__________
*Firm*__________
*Address*__________
*City*__________ *State*__________

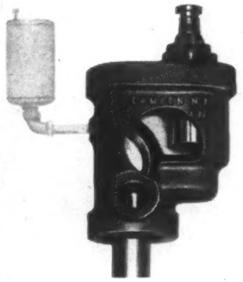
when needed—plus facilitate up to 70 percent bacteria removal. Shown on previous page is plenum model with maximum capacity of 6 lb per hr of water. Includes humidity controller, saddle valve, transformer.



Pyrometer Controller . . .

. . .designed to permit automatic temperature control of four to ten separate units with one instrument—*Thermo Electric Co., Inc., Dept. HPAC, Saddle Brook, N. J.*

Combines accuracy of null balance potentiometer measuring circuit with speed of electronic control system, says company. Recommended by manufacturer for application to almost any installation suitable for two-position control action. Many temperature ranges available between −400 and 3250 F.



Control Valve . . .

. . .designed to eliminate air, noise troubles—*Quality Specialty Co., Inc., Dept. HPAC, 28th St. and Lincoln Ave., Camden 5, N.J.*

"QS No. 102" separates air from water, removes air from heating sys-

"giving acid fumes the air..."

at NORTH AMERICAN

with new

Aerovent

"SP-7" 7-blade semi-pressure DUCT FANS!

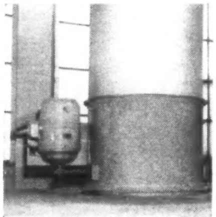
FOR ALL HAZARDOUS ATMOSPHERES

Suitable for high temperatures and corrosive atmospheres, "SP-7" Belt-Driven Duct Fans are available in 14" to 60" diameters.

Installed at the Columbus, Ohio plant of North American Aviation, Inc., these new Aerovent "SP-7" Belt-Driven Duct Fans, with 7-blade "Macheta" Airfoil Propellers, are used to exhaust acrid fumes and steam vapors from a spray-type processing machine. At temperatures of 180° to 200° F., the solution flashes into steam and noxious fumes which would contaminate the entire area if unabated. Located above each end of the spray section, and at intermediate points, the fans induce a steady flow of air through the unit to trap and remove heavy vapors at the source.

Recommended for resistances in the ¾" to 2½" S.P. range, these units, designed for all standard duct systems, move *more air* with less horsepower; provide greater mechanical efficiency with lower initial and operating costs. Also available in Direct-Connected, Extended Shaft, Direct Driven Duct and Divided-Duct types, all "SP-7" Fans may be ordered with special-duty motors, alloy propellers and special protective coatings for extreme temperature, moisture and corrosive conditions.

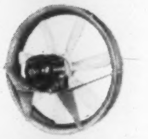
WRITE FOR FREE BULLETIN NO. 400



REMOVES DUSTS, VAPORS, FUMES

Contaminated atmospheres are exhausted safely, efficiently with "sp-7" Belt-Driven Duct Fans! Complete assembly, except motor, mounts inside duct system. Adjustable motor base for correct belt tension. Air-insulated belt housing for adequate cooling, prolongs belt and bearing life.

"SP-7" FANS FOR ALL INDUSTRIAL REQUIREMENTS

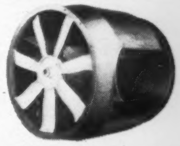


DIRECT CONNECTED

Steel ring or square panel for wall, ceiling or penthouse. 14" to 60". Used with extended shaft for heat, moisture and corrosion.

"BI-FLO" DUCT

New divided-duct design, for air-supply or exhaust. Motor located out of airstream. Also serves as stack booster. Sizes 18" to 48".



DIRECT-DRIVEN DUCT

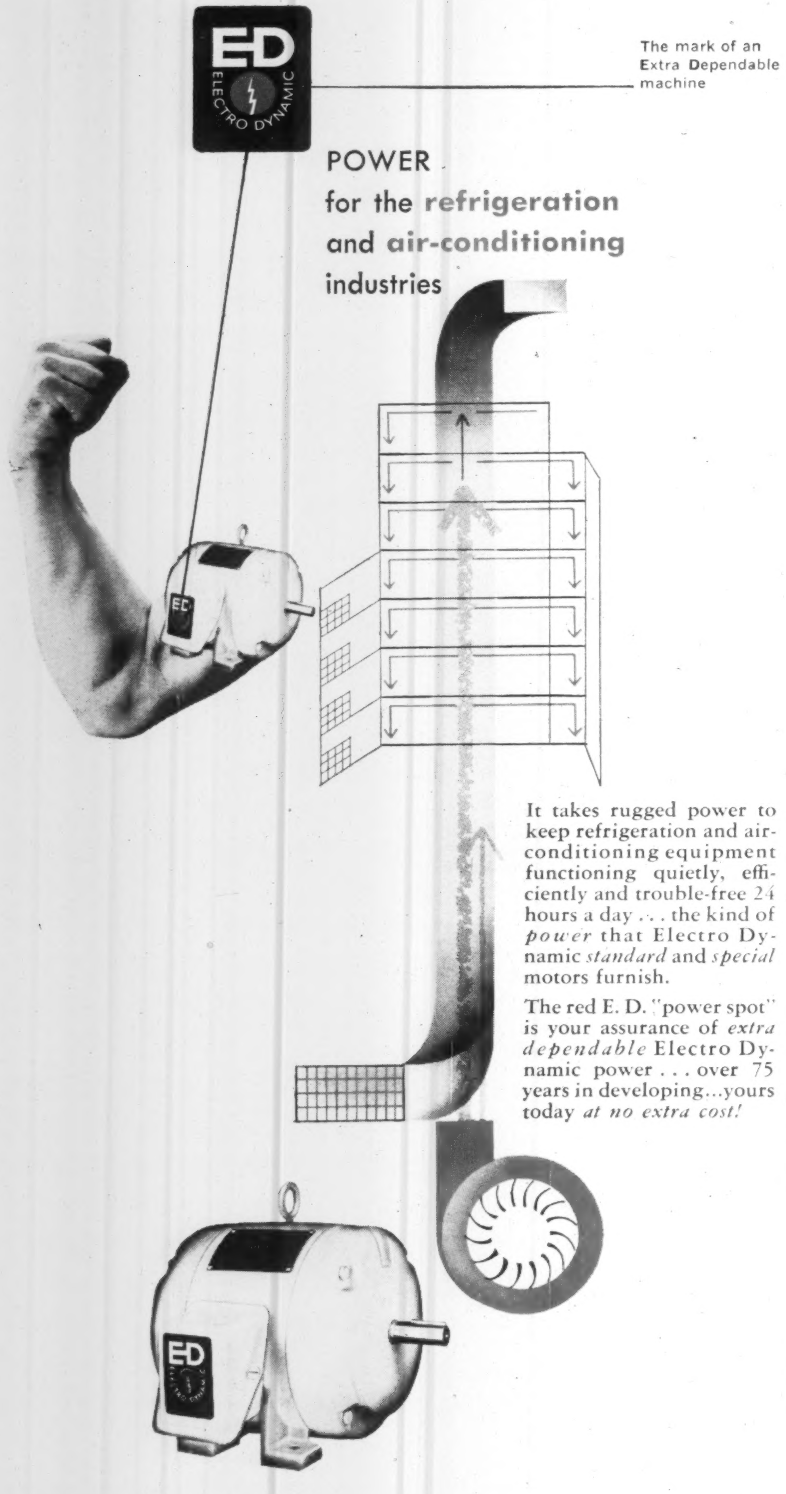
For installations which permit connection of complete fan assembly within airstream. For vertical or horizontal use. Sizes 14" to 60".

All "SP-7" Fans are rated in accordance with the Standard Test Code and conform with U.S.D.C. Comm. Std. CS178-51.

"EFFICIENCY-ENGINEERED" air-moving equipment

Aerovent FAN COMPANY, INC.

Ash and Branch Sts. Piqua, Ohio



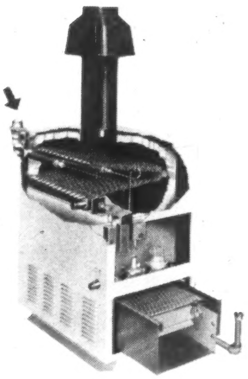
It takes rugged power to keep refrigeration and air-conditioning equipment functioning quietly, efficiently and trouble-free 24 hours a day . . . the kind of *power* that Electro Dynamic *standard* and *special* motors furnish.

The red E. D. "power spot" is your assurance of *extra dependable* Electro Dynamic power . . . over 75 years in developing...yours today *at no extra cost!*

ELECTRO DYNAMIC
DIVISION OF GENERAL DYNAMICS
CORPORATION
BAYONNE, NEW JERSEY

EQUIPMENT DEVELOPMENTS
Continued

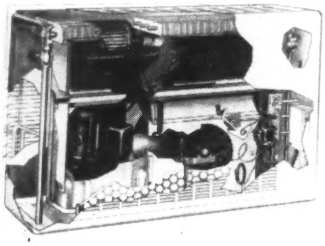
tem while water is being circulated or dormant, says company. Is said to actually separate air from water two times, making certain that air-free water is circulated in radiation. Principle is to keep air at top of boiler from passing into radiation.



Swimming Pool Heater . . .

. . . with "Unatherm Governor" feature — *Raypak Co., Inc., Dept. HPAC, 2416 Chico Ave., El Monte, Calif.*

Installed on heater outlet, governor is automatic bypass control which stabilizes boiler temperature, regardless of changing flow rates from filter or changing pool temperatures, says company. Manufacturer states that damaging condensation in boiler is eliminated, that scaling of boiler water ways is reduced to a minimum, thus extending boiler life.



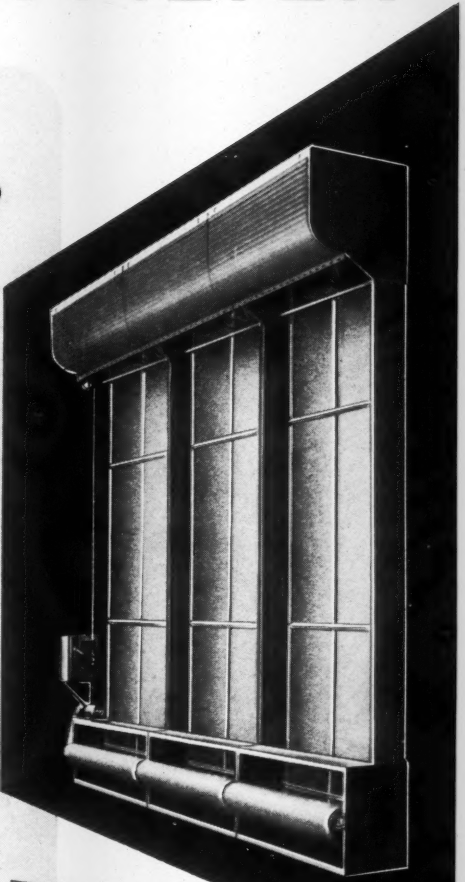
Air Conditioner . . .

. . . for year 'round service in commercial, institutional, industrial buildings—*Warren Webster & Co., Dept. HPAC, 17th & Federal St., Camden 5, N. J.*

GREEN *Sure Seal* AIR FILTER

Two Factors

Assuring Clean Air



One is the filter media itself which is made of practically endless glass filament, so well interlaced as to throw tiny road blocks in the way of every bit of air coming through. There is no direct passage for the air. It must come in contact with fiber in its way through. The entire surface of every fiber is coated with a special viscous oil which not only stops the dust particles carried by the air but anchors them permanently to the fiber.

The other factor assuring clean air at all times is the ingenious floating tubular seal which effectively seals the sides, top and bottom not only when the filter media is stationary but when it is being changed during the indexing of fresh media. Contaminated air cannot sneak into the room around the edges.

If you have a need for clean air in any department or in the whole building, you should investigate the Green Sure Seal Air Filter. But prior to discussing your problem with our engineers, why not send for our Bulletin #175 which gives full details including capacity tables?

NOTE: We are exhibiting this air filter at the 13th International Heating and Air-Conditioning Exposition, International Amphitheatre, Chicago, Illinois, February 25th to March 1st, 1957 — BOOTH NOS. 1243-1245.

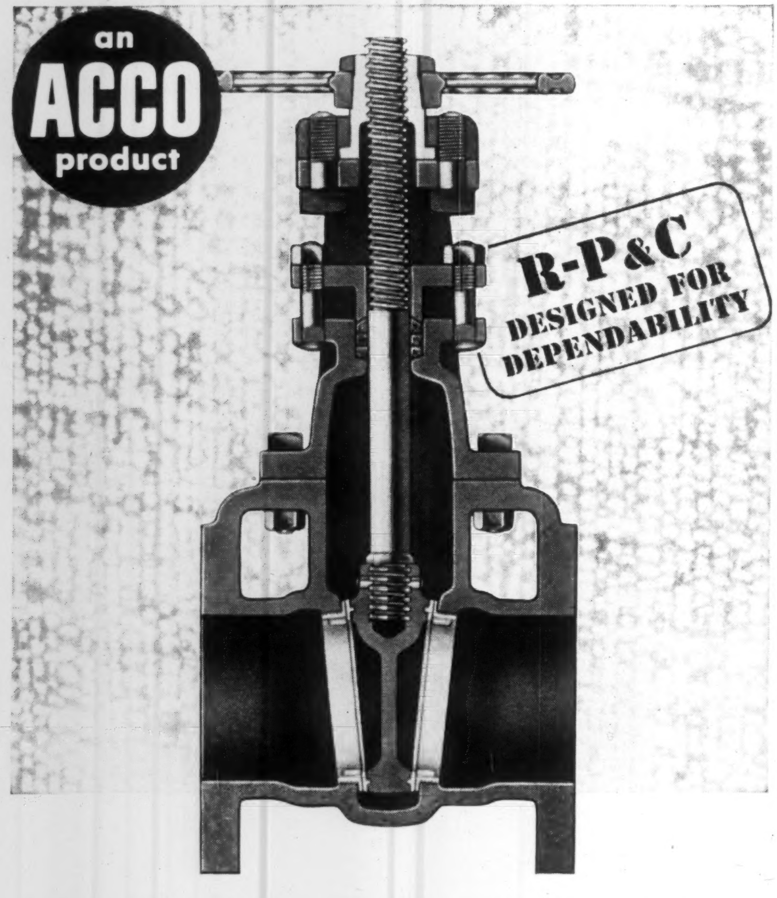
Clean Air
GREEN'S AIR FILTER

Design Features
of the GREEN
SURE SEAL AIR FILTER

- ★ Quality of Filtering media
- ★ Positive Sealing at all times
- ★ Maximum Filtration Area
- ★ Choice of Automatic Controls
- ★ Ease in Changing Rolls
- ★ Wide Capacity Range

U. S. Patents Pending

THE GREEN
POWER AND PROCESS PLANT EQUIPMENT
FUEL ECONOMIZER COMPANY INC.
BEACON 3, NEW YORK
Representatives in Principal Cities



Wedge Gates from 2″ to 24″

—FROM R-P&C's COMPLETE LINE OF IRON BODY VALVES

• Thousands of these **Fig. 625** iron body wedge gate valves, in hundreds of different services, are giving the dependable economical service which has come to be synonymous with R-P&C. Rated for 125 lbs. Steam—200 lbs. OWG in sizes up to 12″, and for slightly lower pressures in larger sizes, they are regularly furnished with bronze trim for use with steam, water, oil or gas. Also provided in all-iron for use with fluids which attack bronze.

• Their record for dependable service and low maintenance requirements is shared by R-P&C's complete line of iron body valves—gates, globes, angles, checks and cocks in a complete range of sizes, body styles and pressure classes up to 250 lbs. All are made from castings of special fine-grained, high test, cast iron —50% stronger than ordinary cast iron. Precision manufacturing and step-by-step quality control result in tight closures, easy operation and longer wear.

See your R-P&C distributor or write for catalog

R-P&C Valve Division
AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit,
Houston, New York, Philadelphia, Pittsburgh, San Francisco,
Bridgeport, Conn.

R-P&C valves

EQUIPMENT DEVELOPMENTS

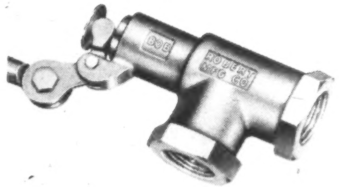
Continued

Engineered for through-the-wall application, in typical 13 in. brick masonry wall. In ¾, 1 hp models.

Taper Face Flange . . .

. . . designed to protect valves, lower installation costs—*Tube Turns, Div. of National Cylinder Gas Co., Dept. HPAC, 224 E. Broadway, Louisville 1, Ky.*

New 125 lb. lightweight, welding neck flange is said to offer important technical, cost advantages where lighter schedule of pipe must be connected to 125 lb cast iron valves, other equipment. Cited features: tapered face causes greater pressure to be exerted near bore; can be safely bolted to cast iron or semi-steel flanges. Rated at 125 lb for water, oil, gas service.



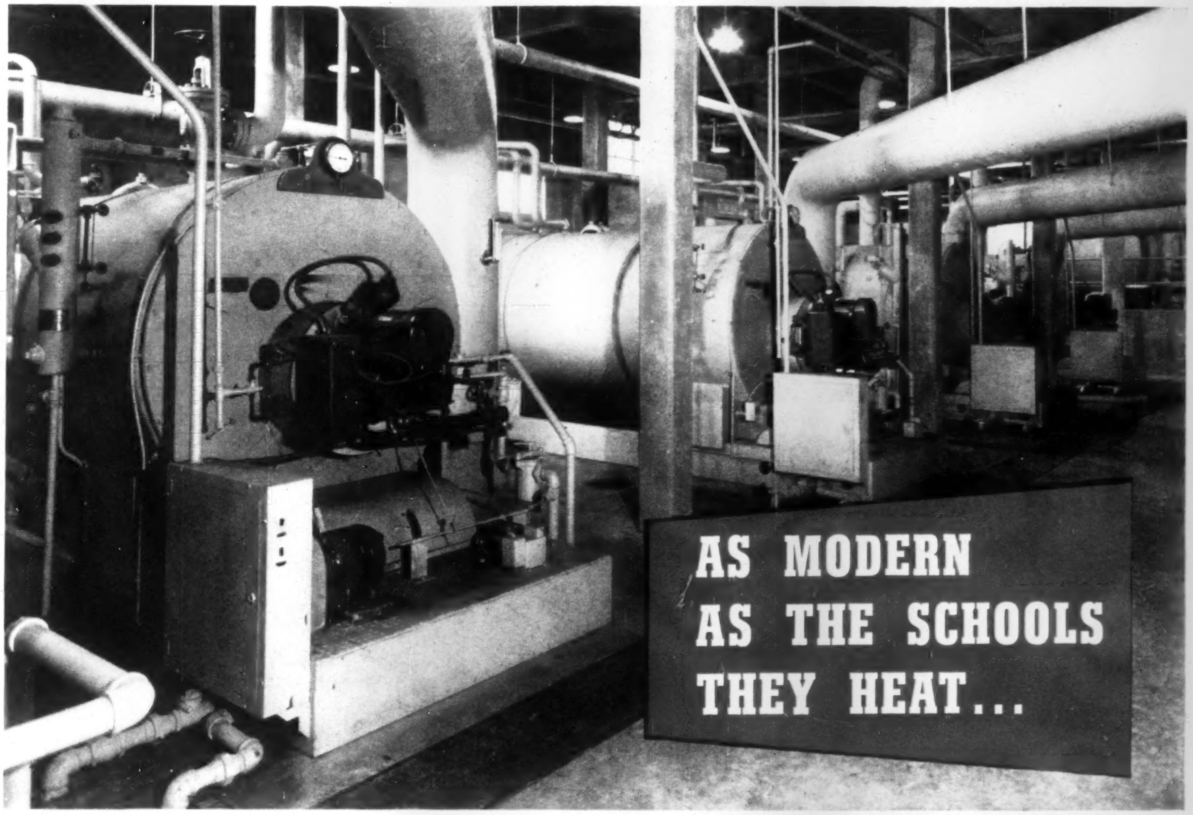
Float Valves . . .

. . . for control of corrosive fluids—*Robert Mfg. Co., Dept. HPAC,* 9035 *Venice Blvd., Los Angeles* 34.

Fabricated from stainless steel. Available with threaded or socket welding ends. Adjustable arm assembly engineered to simplify control of fluid level. Cited applications include oil, chemical, textile and paper industries, other uses where piping systems handle corrosive fluids.

Armstrong High School, Richmond, Virginia
Carneal & Johnston, Archs. & Engrs. Richmond.

Four 125 hp. Superior Steam Generators for efficient, dependable heat and hot water.



...and best for industry too...

The excellence of modern school design is setting new standards for all types of industrial and institutional building . . . and it's no coincidence that hundreds of these highly efficient school buildings are equipped with Superior Steam Generators.

Superior Steam Generators offer the same functional design, the same ease of maintenance, the same years-ahead planning, and the same low operating and upkeep costs which make these school buildings outstanding.

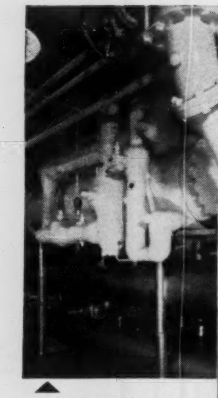
Complete packages, ready to go to work when delivered, Superior Steam Generators are factory fire-tested to insure peak performance, and backed by undivided responsibility. They require no expensive setting, no high stack; are equipped with an integrated induced draft system for cleaner, more quiet operation; and are fully automatic burning oil or gas.

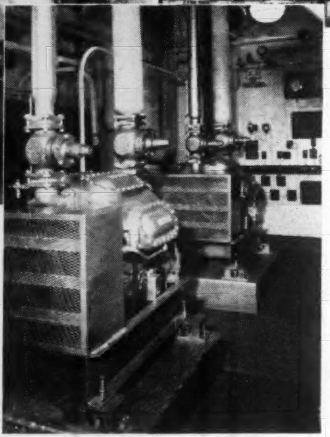
Superior Steam Generators are built in 18 sizes, from 20 to 600 b.h.p., for pressures to 250 p.s.i., also for hot water. Write today for complete details in Catalog 804F.

for performance you can **BANK** on

SUPERIOR
STEAM GENERATORS

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.





Service
IMPROVES
with
Comfort

Office building, Southwestern Bell Telephone Company, St. Joseph, Missouri.

Part of the Vilter air conditioning equipment at Southwestern Bell: Freon heat exchanger, 5-pass Freon water chiller, 2-pass Freon condenser, and Freon liquid receiver.

Two Vilter Freon 12-VMC compressors, complete with oil separators.

Q. How can the summer efficiency of many operators be increased in a busy telephone exchange?

A. with efficient Vilter AIR CONDITIONING

that costs less to own*

Busy workers throw off a great deal of heat—even though many are seated at long switchboards. Warm, "sticky" atmosphere means short tempers and reduced efficiency. BUT dependable air conditioning with proper humidity control, filtering and ample fresh air will rapidly change this. And the best solution of all is to install a Vilter system to assure efficient, economical results at a reasonable cost.

The Vilter equipment included in this telephone company installation consists of two 8-cylinder Freon 12-VMC compressors, a 2-pass Freon condenser, liquid receiver, water cooler and heat exchanger. The VMC's are designed for smooth operation, efficient performance and a minimum of vibration to reduce the noise level . . . a real asset in an office building.

A high point of the application is the attractiveness of this installation. Vilter, while primarily interested in utility, also exerts every effort to include eye-appeal in the design and installation of equipment.

See your nearest Vilter engineer, today, for a careful evaluation of your air conditioning and refrigeration needs.

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

Vilter

QUALITY CRAFTSMANSHIP that lasts . . .
ENGINEERING DESIGN that guarantees performance

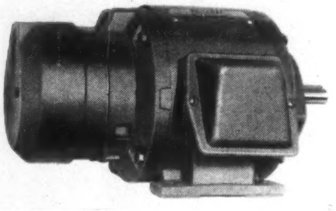
REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines

EQUIPMENT DEVELOPMENTS

Continued



Brakemotors . . .

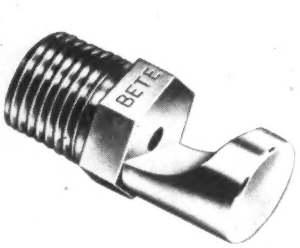
. . . designed to stop "instantly," hold on heavy loads—*Reliance Electric & Engineering Co., Dept. HPAC, 1088 Ivanhoe Rd., Cleveland 10.*

Cited features include: wide torque range, one-piece molded friction linings for quick stops, one-operation torque setting. Enclosures available suitable for outdoor installation or where extremely moist, corrosive, or abrasive dust conditions exist.

Cleaner . . .

. . . for air conditioning, wet heating, water cooled refrigeration equipment —*Chemical Solvent Co., Inc., Dept. HPAC, P. O. Box 487, Birmingham, Ala.*

"Ultra Solvex" formulated to be safe, rapid, versatile cleaner for removing hard scale from water cooled condensers, wet heat exchangers. Also recommended by company for cleaning boilers, opening sluggish drain lines and hot water systems. In 10 lb container.



Flooding Nozzles . . .

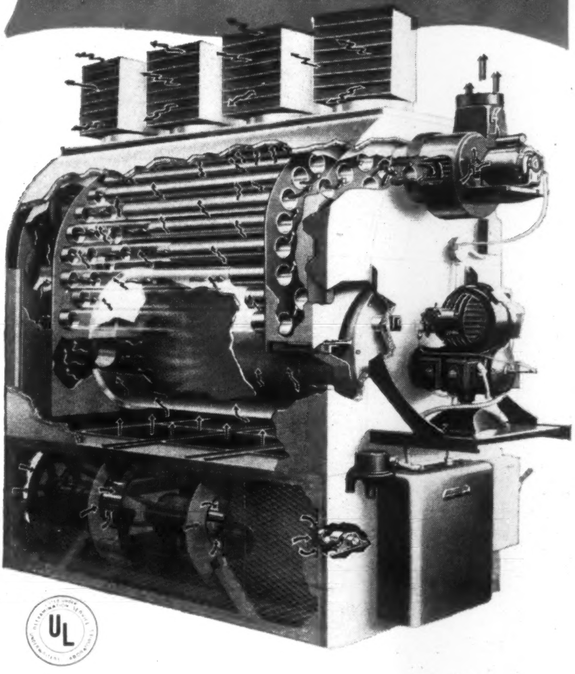
. . . designed for wide angle flat spray pattern—*Bete Fog Nozzle, Inc., Dept. HPAC, 309 Wells St., Greenfield, Mass.*

145 deg angle at 45 psi units recommended by company for spray-

Commercial-Aire

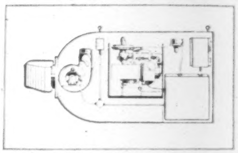
DIRECT-FIRED

Space Heaters

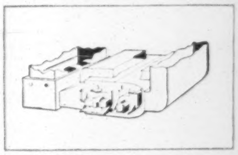


300,000 BTU's
TO 2,000,000 BTU's

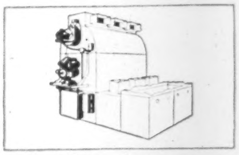
Provides industry with lowest cost heating. Primary cylindrical stainless steel combustion chamber, secondary heat-extracting tubes, consistent rate of combustion gas flow provide high efficiency, utilizing 80% of available heat of fuel. Highly adaptable to desired mounting arrangements. Features low first cost, easy maintenance, complete accessibility to all service points. Completely equipped and wired with controls for economical installation. Write for Bulletin C-356.



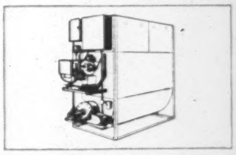
Series "H"
Horizontally suspended.



Series "HD"
Horizontally for duct distribution.



Series "FD"
Upright for duct distribution.

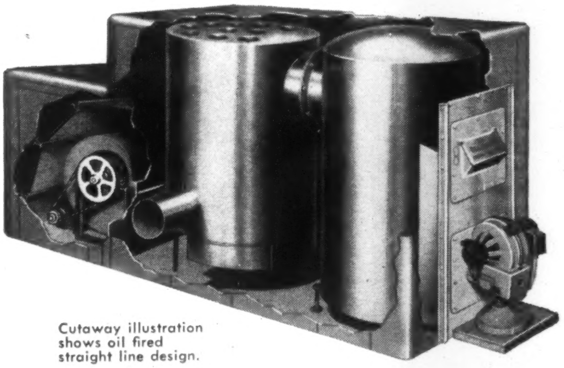


Series "U"
Inverted suspended.

MAMMOTH

ADAPTO FURNACES

7 DESIGNS FROM 8 SIZES/315,000 TO 2,379,000 B.T.U.'s



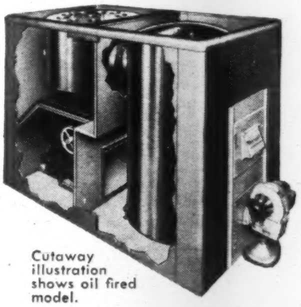
Cutaway illustration shows oil fired straight line design.

Efficient, economical, convenient and adaptable. Vertical tubular design, welded heavy duty, boiler plate steel construction. Economical with all types of fuel because of balanced heat transmission. A size and casing arrangement to fit every location. Features long flue travel, heat saver, extra head space. Radiant straight line heat increases efficiency. Baked enamel casings. Oil, gas or coal fired. Write for Bulletin 54M-1.

MAMMOTH

COMPACTO FURNACES

5 SIZES/175,000 to 413,000 B.T.U.'s



Cutaway illustration shows oil fired model.

Efficient, compact, convenient and economical. Vertical tubular design. Welded heavy duty boiler steel construction. Compact casing encloses primary chamber, heat saver, blower, motor and filters. Efficient and economical with *oil, gas,* or *coal.* Write for Bulletin 54M-1.

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(Main Floor Center)

13TH INTERNATIONAL
HEATING AND AIR CONDITIONING EXPOSITION
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FEBRUARY 25th to MARCH 1st

MAMMOTH FURNACE COMPANY
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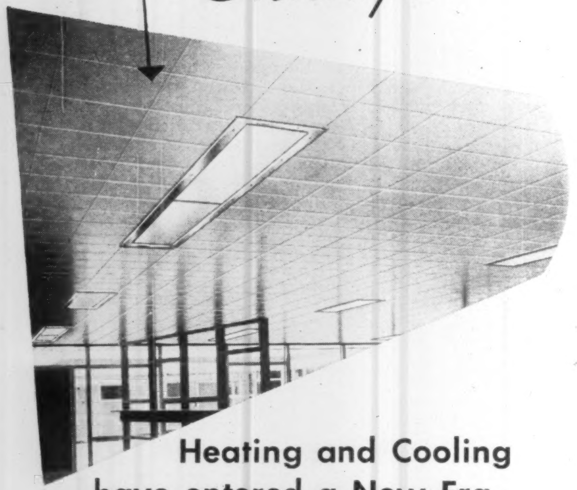
It's time for a
Change!



Heating and Cooling
have entered a New Era

The principles featured in this new standard of comfort heating are based on age old, basic laws of nature heretofore largely ignored in heating methods. Now these highly desirable principles and advantages are incorporated in the Burgess-Manning Radiant Acoustical Ceiling to provide a true radiating heat resulting in the closest to ideal, natural comfort at lower temperatures. It is the only method of heating to offer uniform heat from ceiling to floor with essentially no variation — elimination of drafts and concentrated heat sources —and highest efficiency in acoustic control. Other important advantages are:

✓ Lower operating costs fuel-wise
✓ Lower redecorating costs
✓ Negligible maintenance
✓ Smaller ducts and air handling equipment
✓ Lower building height
✓ Increased floor space thru elimination of standing radiators, convectors, etc., employed in systems for hot air distribution.

Many other important features, not mentioned here, are covered in a new, illustrated catalog—be sure to write for it.

Ask for Catalog No. A-138H

Architectural Products Division of
BURGESS-MANNING COMPANY
5970 Northwest Highway, Chicago 31, Ill.
Manufacturers of 3-Way Functional Ceilings and Acousti-Booths for Telephoning

ing flooded eliminator plates in air washers, for special fire protection problems, for industrial applications where wide angle fan spray is required. Available in nine models $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ in., with male pipe thread connections.

Packaged Air Conditioning Units . . .

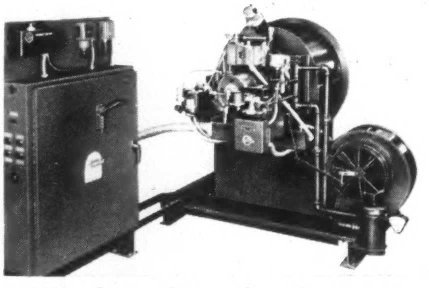
. . .for installation in restaurants, banks, schools, churches, hotels, small theaters, hospitals, offices, public buildings, other small commercial and industrial structures, institutions—*American Blower Corp., Dept. HPAC, Detroit* 32.

Self contained units available in 3, 5, $7\frac{1}{2}$, 10, 15, 20 ton sizes. Sloped cooling coil design is said to permit greater cooling area for given coil size.

Horizontal Earth Boring Machines . . .

. . .with increased boring speeds—*Hydrauger Corp., Ltd., Dept. HPAC,* 681 *Market St., San Francisco* 5.

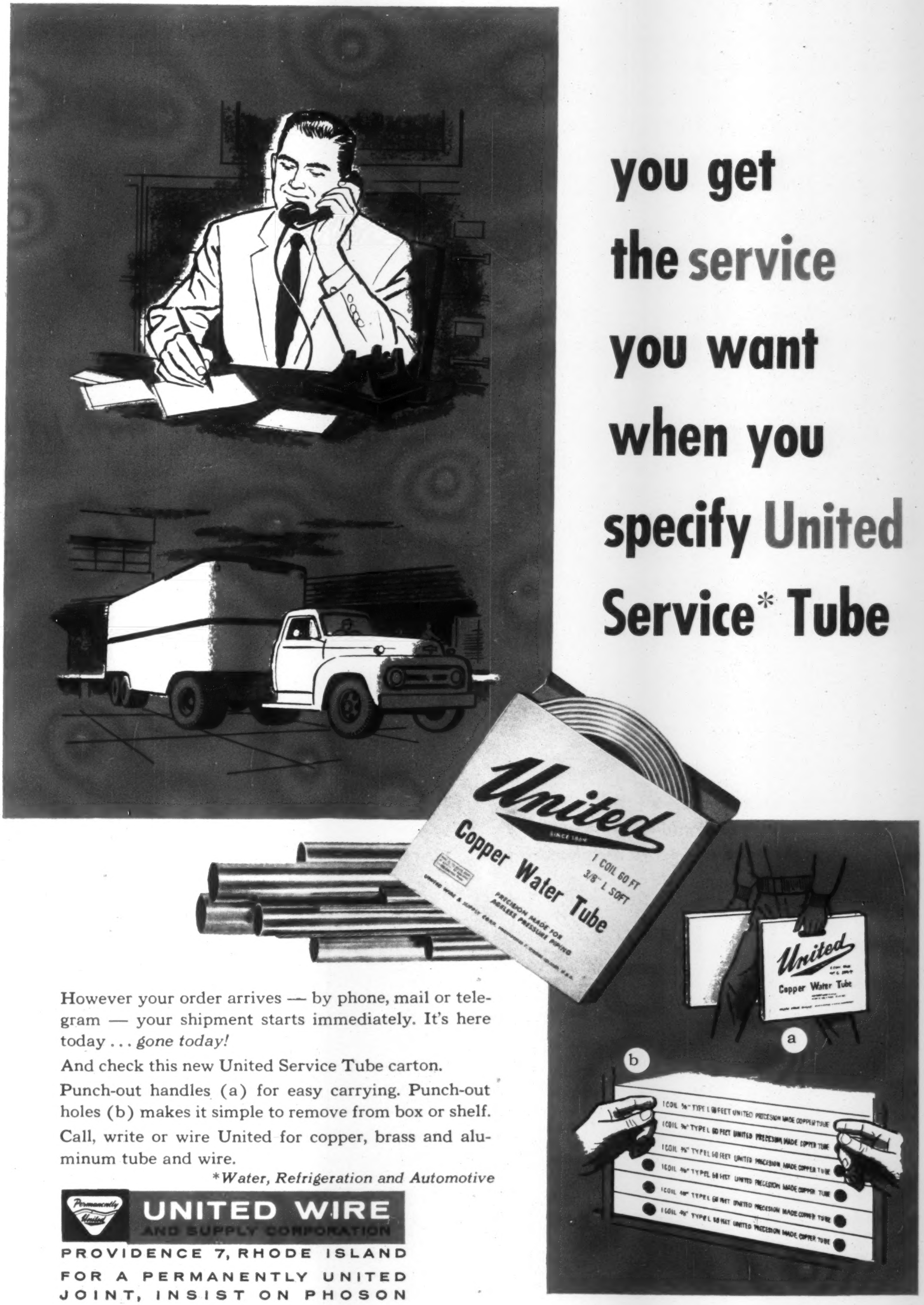
Feature is said to be result of redesigning, incorporation of high torque, multivane air motors. Machines available in several new sizes, modifications. Larger units designed to bore holes 2 to 24 in. diameter for distances to 250 ft.



Forced Draft Fuel Burning Systems . . .

. . .for use with Scotch marine type boilers—*Ace Engineering Co., Dept. HPAC,* 1435 *W.* 15*th St., Chicago* 8.

Units consist of burner, wind box, forced draft fan, curved slot linkage, control panel, base, wiring, piping. In capacities 1,275,000 to 16,390,000 Btu per hr input for oil, gas.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Copper Water Tube
1 COIL 60 FT
3/8" L SOFT
PRECISION MADE FOR AGELESS PRESSURE PIPING
a
b
1 COIL 3/8" TYPE L 60 FEET UNITED PRECISION MADE COPPER TUBE

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However your order arrives — by phone, mail or telegram — your shipment starts immediately. It's here today . . . *gone today!*

And check this new United Service Tube carton.

Punch-out handles (a) for easy carrying. Punch-out holes (b) makes it simple to remove from box or shelf.

Call, write or wire United for copper, brass and aluminum tube and wire.

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UNITED WIRE
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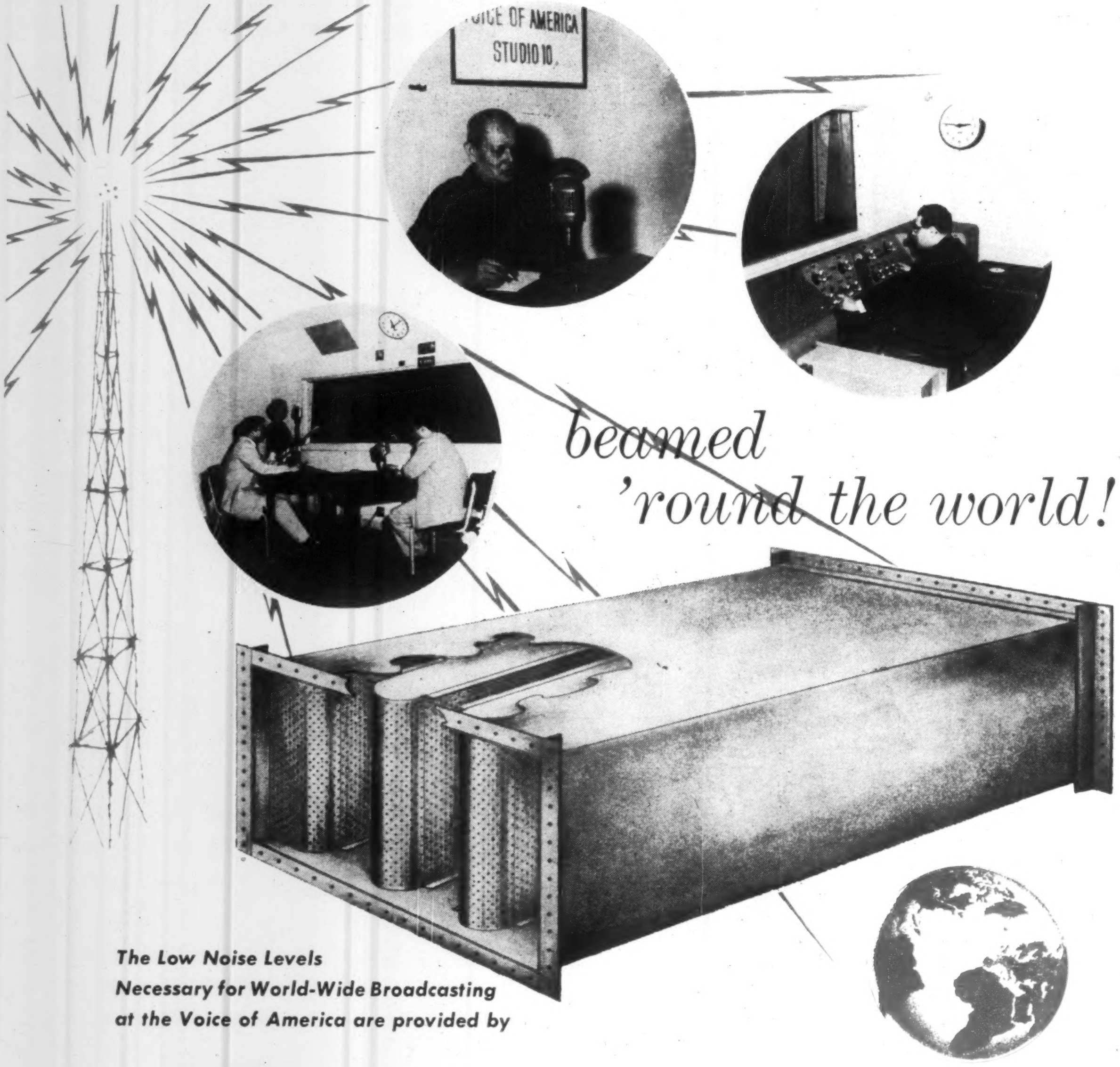
PROVIDENCE 7, RHODE ISLAND
FOR A PERMANENTLY UNITED JOINT, INSIST ON PHOSON



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Yes, the new IAC Quiet-DUCTS eliminate noise from air conditioning and ventilating systems to meet every performance requirement!
Prefabricated in as many as 148 sizes, these economical "Quiet-DUCT" units which measure in length from 2 to 10 feet provide as much noise control as a conventional lined duct measuring from 30 to 100 feet long!

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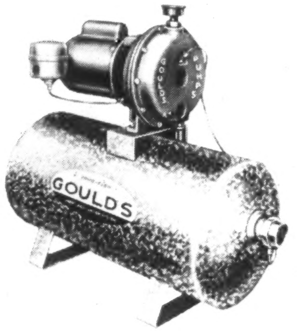
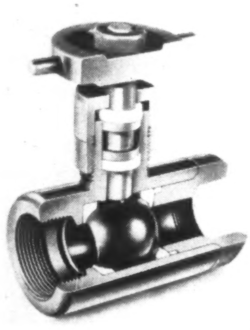


Water System . . .

. . . for deep well applications—*Goulds Pumps, Inc., Dept. HPAC, Seneca Falls, N.Y.*

Feature of unit is self priming ability, says company. Cast iron parts coming in contact with water are protected against rust, corrosion. Motor is 60 cycle, single phase, capacitor type, 3500 rpm with built-in overload protection. System available packaged on 12 or 30 gal tank or as basic pump system for separate tank.



PVC Ball Valve . . .

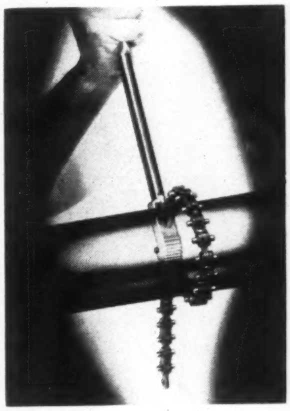
. . . with "Double-Seal" design—*Jamesbury Corp., Dept. HPAC, 62 Millbrook St., Worcester 5, Mass.*

Is said to combine new design principle with polyvinyl chloride for handling corrosive, other difficult fluids. Recommended by company for use in many plastic or metal piping systems for either vacuum or pressure service. Cited features include full flow, quarter-turn shutoff, minimum maintenance. Rated 150 psi at ambient temperatures, 50 psi at 130 F.

Desiccants . . .

. . . formulated to have high water adsorption capacity at very low water concentrations, high temperatures—*Linde Air Products Co., Div. of Union Carbide and Carbon Corp., Dept. HPAC, 30 E. 42nd St., New York 17.*

"Molecular Sieves" recommended by company for maintaining minimum dryness of refrigerants. Very small pores in crystalline structure of desiccant exclude both refrigerant, oil molecules from adsorption surface. Entire surface is used for water molecules, hence high capacity, says manufacturer.



Wrench, Vise Chain . . .

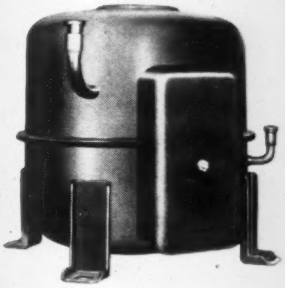
. . . designed for applications where strength in tension, flexibility and quick, easy changes in chain wrap are necessary—*Morse Chain Co., Dept. HPAC, Ithaca, N.Y.*

Extended pins on both sides provide quick, positive locking action, says company. Unit has 5/8 in. pitch. Average ultimate strength is 7400 lb.

Air Conditioner . . .

. . . engineered to fit most any type of window—*King Refrigerator Corp., Dept. HPAC, 76-12 Woodhaven Blvd. Glendale, L.I., N.Y.*

Can be mounted in upper or lower sash of double-hung windows, flush with wall; in casement windows with no cutting metal sash; all outside or inside room with windows operating; through-the-wall, flush inside or outside. Measures 16½ in. deep. In ¾, 1 hp sizes.



Motor-Compressor . . .

. . . units for low, medium, high temperature applications—*Bendix-Westinghouse Automotive Air Brake Co., Evansville Div., Dept. HPAC, 950 E. Virginia St., Evansville, Ind.*

Recommended by company for central air conditioning, room air conditioners, liquid chillers, dehumidifiers. In single cylinder, twin cylinder models. All moving parts of hermetic units lubricated by forced feed oiling system, says company.

Air Filters . . .

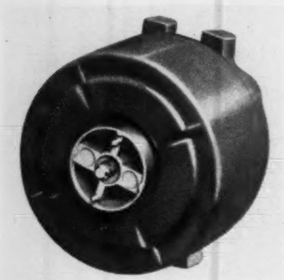
. . . for use in electronics equipment—*Farr Co., Dept. HPAC, P. O. Box 45187, Airport Sta., Los Angeles 45.*

Designed to meet need for increased cabinet ventilation in miniaturized electronic equipment. Sizes range 2 × 2 × 2 in. to 2 × 2 × 8 in. Round type, 2 × 3 in. diameter, also available.

Moisture Indicator . . .

. . . designed to indicate dangerous presence of too much moisture by changing color—*Ansul Chemical Co., Dept. HPAC, Marinette, Wis.*

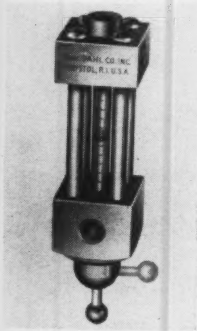
When used in combination with company's "T-Flo" drier, "becomes complete moisture control system for refrigeration equipment," says manufacturer.



Shaded Pole Motor . . .

. . . for air conditioning, refrigeration—*Redmond Co., Inc., Dept. HPAC, Monroe St., Owosso, Mich.*

"Monomotor" four pole unit rated 1550 rpm. Recommended by company for all position mountings, vertical shaft up, shaft down, or any angle. Operates on 115 volts, 65 cycles.



Sight Flow Indicator . . .

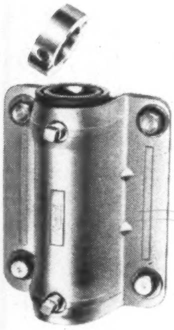
. . . designed as combination header, "Demi" toggle valve for tight shutoff—*George W. Dahl Co., Dept. HPAC, Bristol, R.I.*

Recommended by company to indicate leakage flows, any flow which is small and requires constant checking. Open or closed position indicated by colored ball. Flow range available is 0-2 scfh.

Iron Powder Electrode . . .

. . . developed to meet requirements of AWS-E-6010 classification—*Air Reduction Sales Co., Dept. HPAC, 150 E. 42nd St., New York 17.*

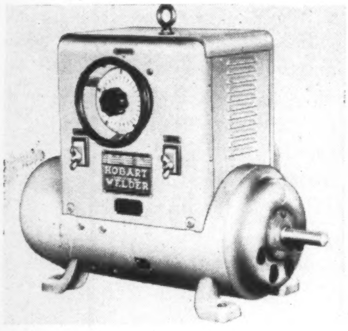
Using normal techniques and normal arc length, "Easyarc 10" provides shallow rippled, smooth weld deposit in all positions including vertical down, says company. For applications such as tanks with plain or galvanized surfaces, field construction, areas where out-of-position welding is encountered.



Bearing Assembly . . .

. . . engineered for vertical or thrust loads—*Randall Graphite Bearings, Inc., Dept. HPAC, Greenlawn and Lake Sts., Lima, Ohio.*

Unit is self lubricating, self aligning, quiet operating, provides long and trouble-free service, says company. "Duplex" assembly combines two sleeve bearing ball assemblies in single steel housing.



Generator . . .

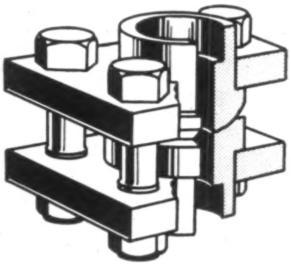
. . . of company's 250 ampere air cooled gasoline engine driven arc welder available as separate unit (less engine)—*Hobart Bros. Co., Dept. HPAC, Troy, Ohio.*

Can be operated by direct coupling to gasoline engine, or through v-belts and grooved pulleys connected to electric motor, gasoline engine, or PTO of tractor, truck, etc., says company. Control panel on front of generator has multirange dual control switch with five main ranges of welding current, 100 steps of volt-ampere adjustment in each range.

Ferruling Tool . . .

. . . engineered to aid in makeup of flareless type tube fittings—*Tube & Hose Fittings Div., Parker Appliance Co., Dept. HPAC, 17325 Euclid Ave., Cleveland 12.*

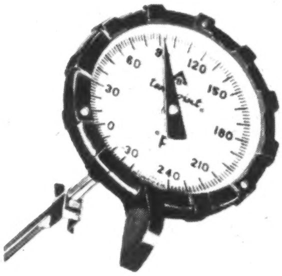
"Ferulset," for mounting in vise, is said to expedite presetting of fitting ferrule onto metal tube. Available in range of sizes for fittings used with tubing ½ to 2 in. OD.



Flange Union . . .

. . . for high pressure service—*Almar Hydraulic Valve Co., Dept. HPAC, 10011 Meech Ave., Cleveland 5.*

With socket weld connections. Designed to withstand pressures to 3000 psi for schedule 80 pipe. Special unions of same design available for pressures to 10,000 psi, says company. Cited features are "true-ball" seat, revolvable flanges. For pipe sizes ⅛ to 6 in.



Dial Thermometer . . .

. . . for indoor, outdoor use—*Bacharach Industrial Instrument Co., Dept. HPAC, 200 N. Braddock Ave., Pittsburgh 8.*

DON'T WAIT FOR "AUDREY", "BERTHA" OR "CARRIE"

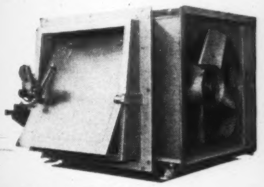
TO SELL YOU A WING DRAFT INDUCER . . .

The "Lady" hurricanes in the east are especially effective sellers, but across the country many a gust of wind brings rush orders for Wing Draft Inducers. Nearly every tall stack is a prime target for high winds and hurricanes—and, if your plant has one, your best insurance against the damage and downtime of a wrecked stack is a Wing Draft Inducer. It is a complete unit, easily and quickly installed and requires only enough chimney to vent the gases.

Besides, a Wing Draft Inducer also eliminates costly periodic paintings and repairing.

We would rather you install a Wing Draft Inducer *before* the wind strikes—then your tall chimney worries will be gone—and you'll be getting more dependable draft!

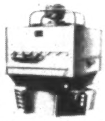
Write for copy of Bulletin I-56.



Wing
DRAFT INDUCERS

L. J. Wing Mfg. Co. 140 Vreeland Mills Rd., Linden, N.J.
Factories: Linden, N.J. and Montreal, Canada

WING REVOLVING HEATERS



WING FRESH AIR SUPPLY HEATERS

WING TURBINES

WING MOTORIZED BLOWERS

WING TURBINE BLOWERS

L. J. Wing Mfg. Co. HP-2
140 Vreeland Mills Rd., Linden, N. J.

Please send copy of Draft Inducer Bulletin I-56.

Name..

Firm..

Address..

City.................... Zone...... State........

Recommended by company for outdoor temperature readings when adjusting air conditioning systems using outdoor type temperature control; measurement of register, duct and furnace control temperatures on forced air heating systems; temperature checks in walk-in coolers, cold storage rooms. Range of unit is −40 to 240 F.

Cooling Tower . . .

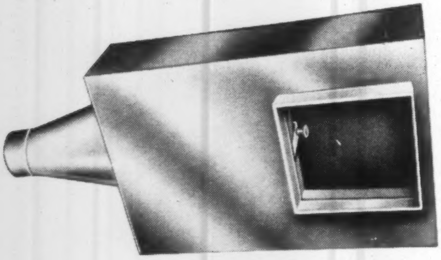
. . .constructed to have increased height—*J. F. Pritchard & Co. of California, Dept. HPAC, 4625 Roanoke Pkwy., Kansas City 12, Mo.*

Feature facilitates greater capacity for air conditioning, water cooling for industrial processes, says company.

Air Conditioning, Wet Heat . . .

. . .combination systems in ½, ¾, 1 ton capacities—*Embassy Steel Products, Inc., Dept. HPAC, 890 Stanley Ave., Brooklyn 8.*

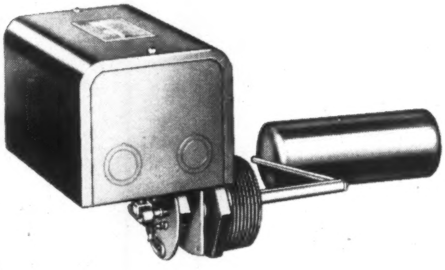
Company manufactures convector and element to fit self contained air conditioners manufactured by others.



High Pressure Terminals . . .

. . .for control, distribution of air in high velocity systems—*Air Devices, Inc., Dept. HPAC, 185 Madison Ave., New York 16.*

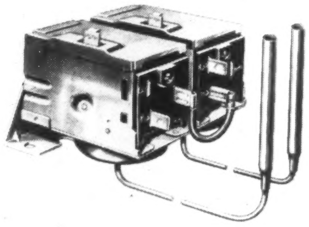
Available in range of sizes, types for overhead or perimeter air distribution in single or dual duct applications. Cited features: nonclogging mixing valves; air balancing adjustment; noise attenuation plenums insulated with "Neoprene" coated glass fiber blankets; selection of square, rectangular, slot type, circular diffusers.



Mechanical Alternators . . .

. . .for closed duplex pump systems—*Square D Co., Dept. HPAC, 4041 N. Richards St., Milwaukee 12.*

In screw-in (shown), flange mounted types. Latter is designed for application where mounting is to be made at top of closed tank. Units have four concentric knockouts for ½ or ¾ in. conduit.



Air Conditioning Controls . . .

. . .for use in control panels on commercial installations—*Ranco, Inc., Dept. HPAC, 601 Fifth Ave., Columbus, Ohio.*

Variety of models available permit adaptation to number of other applications, says company. Series includes high, low temperature models with automatic or manual reset, low pressure cycling controls with differential adjustment, dual pressure controls. Ranges of pressure operated units vary 7 to 425 psi (nonadjustable).

Electronic Air Cleaners . . .

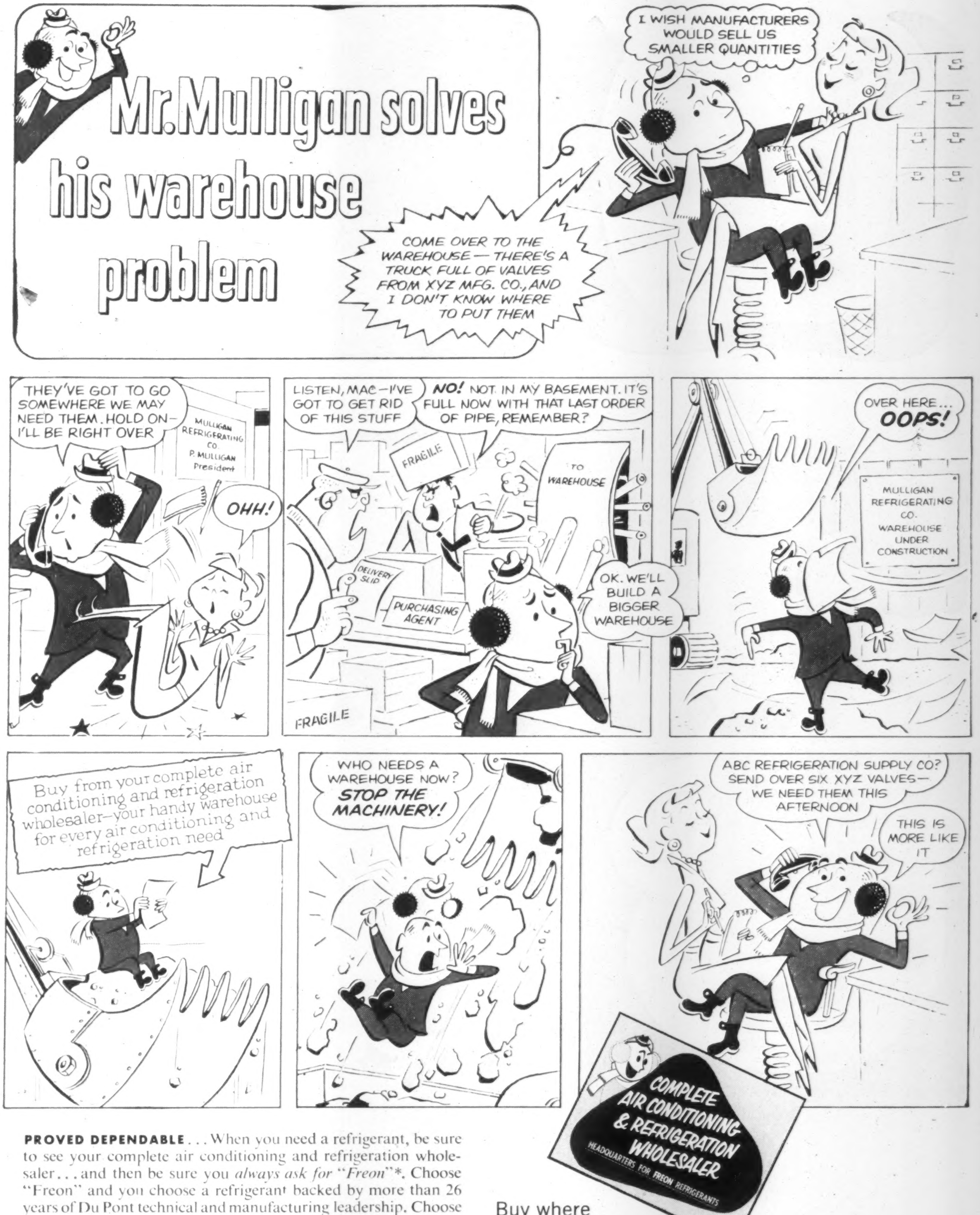
. . .with design improvements—*Westinghouse Electric Corp., Dept. HPAC, Box 2278, Pittsburgh 30.*

Redesign of working elements is said to allow velocities to 600 fpm. "Precipitron" cleaners have their own enclosures, fewer parts, says company, no elaborate foundations required. Face dimensions of cells correspond with standard panel filter sizes.

Humidity Detecting System . . .

. . .for determining moisture conditions in sealed packages without breaking seals—*El-Tronics, Inc., Dept. HPAC, 16th St. and Pennsylvania Blvd., Philadelphia.*

Consists of electrical resistance humidity sensing element and housing, indicator, mounting assembly. Designed to maintain constant surveillance of stored, desiccated packages.


Mr. Mulligan solves his warehouse problem
I WISH MANUFACTURERS WOULD SELL US SMALLER QUANTITIES
COME OVER TO THE WAREHOUSE — THERE'S A TRUCK FULL OF VALVES FROM XYZ MFG. CO., AND I DON'T KNOW WHERE TO PUT THEM
THEY'VE GOT TO GO SOMEWHERE WE MAY NEED THEM. HOLD ON— I'LL BE RIGHT OVER
MULLIGAN REFRIGERATING CO. P. MULLIGAN President
OHH!
LISTEN, MAC—I'VE GOT TO GET RID OF THIS STUFF
NO! NOT IN MY BASEMENT. IT'S FULL NOW WITH THAT LAST ORDER OF PIPE, REMEMBER?
FRAGILE
TO WAREHOUSE
DELIVERY SLIP
PURCHASING AGENT
OK. WE'LL BUILD A BIGGER WAREHOUSE
FRAGILE
OVER HERE... OOPS!
MULLIGAN REFRIGERATING CO. WAREHOUSE UNDER CONSTRUCTION
Buy from your complete air conditioning and refrigeration wholesaler—your handy warehouse for every air conditioning and refrigeration need
WHO NEEDS A WAREHOUSE NOW? STOP THE MACHINERY!
ABC REFRIGERATION SUPPLY CO? SEND OVER SIX XYZ VALVES— WE NEED THEM THIS AFTERNOON
THIS IS MORE LIKE IT
COMPLETE AIR CONDITIONING & REFRIGERATION WHOLESALER
HEADQUARTERS FOR FREON REFRIGERANTS

PROVED DEPENDABLE... When you need a refrigerant, be sure to see your complete air conditioning and refrigeration wholesaler... and then be sure you *always ask for "Freon"**. Choose "Freon" and you choose a refrigerant backed by more than 26 years of Du Pont technical and manufacturing leadership. Choose "Freon" and you choose a refrigerant that sets the industry's standard for purity and dryness.

Buy where you see this sign . . .

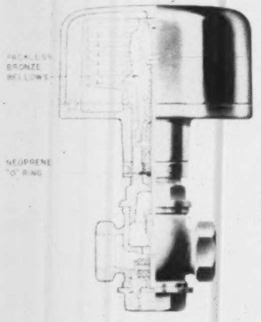
KINETIC
REG. U. S. PAT. OFF.

DU PONT
REG. U. S. PAT. OFF.

FREON REFRIGERANTS

BETTER THINGS FOR BETTER LIVING... *THROUGH CHEMISTRY*

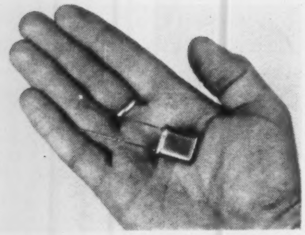
**"Freon" is Du Pont's registered trademark for its fluorinated hydrocarbon refrigerants.*



Packless Valves . . .

. . .designed for more precise control, reduced valve maintenance and operating costs—*Powers Regulator Co., Dept. HPAC,* 3434 *Oakton St., Skokie, Ill.*

For convectors, unit ventilators, air conditioners, radiators. Instead of packing, unit uses bronze bellows as primary seal, and spring loaded "Neoprene" o-ring as secondary seal. Bellows is said to eliminate leakage.



Thermostat . . .

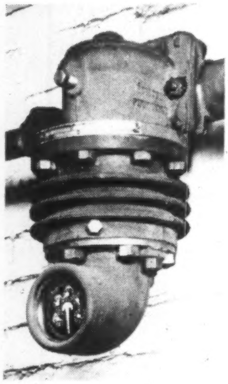
. . .for applications where maximum shock, vibration resistance required —*Metals & Controls Corp., Spencer Thermostat Div., Dept. HPAC, Attleboro, Mass.*

Snap-acting, disc type unit features thermal element, silver electrical contacts, hermetically sealed assembly. Standard temperature settings, which are fixed, range −20 to 400 F.

Safety Gages . . .

. . .designed to provide safety to observer from possible bursting of bourdon tube due to excessive pressure, corrosion, other damaging or weakening factors—*Weksler Thermometer Corp., Dept. HPAC, East Merrick Rd., Freeport, N. Y.*

Also, afford easy access to internal mechanism of gage for repairs, inspection, cleaning or recalibration, says company. Units adaptable for wall, flush, direct mounting. Can be furnished in 4½, 6, 8½ in. dial sizes, in standard pressure ranges to 10,000 psi.



Steam Meter . . .

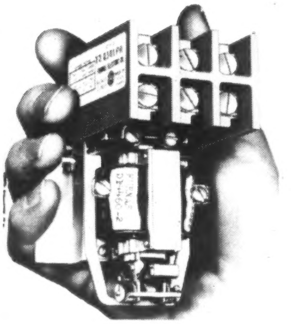
. . .with newly designed cooling chamber equipped with exterior cooling fins engineered to provide greater radiating surface to keep meter cool —*Builders-Providence, Inc., Div. of B-I-F Industries, Inc., Dept. HPAC,* 345 *Harris Ave., Providence, R. I.*

Another feature is in meter body which now accommodates concentric orifice for sizing meter. Orifice replaces previously required bypass plate, provides improved accuracy by eliminating variable factors influencing effective flow area of meter, says company.

Room Air Conditioners . . .

. . .for 1957 expanded from 11 to 16 models—*Emerson Electric Mfg. Co., Dept. HPAC,* 8100 *Florissant Ave., St. Louis* 21.

Cited features include slimness, shorter depths, thermostatic control, flush mounting. Outstanding additions to line, says company, are ¾ hp, 7½ amp unit designed to satisfy demand for lower amperage; 1 hp, 115 volt, 12 amp unit said to provide greater capacity without requiring special wiring; two new "Tiny Tim" and "Veri-Slim" models.



Controls . . .

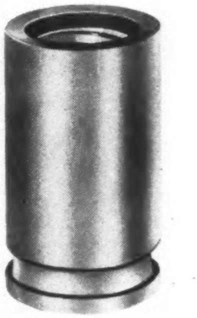
. . .for air conditioning, refrigeration —*Furnas Electric Co., Dept. HPAC,* 1000 *McKee St., Batavia, Ill.*

In four sizes rated 20, 30, 35, 50 amperes. Cited features include: silver cadmium oxide contacts for long control life; magnets requiring less wattage to reduce transformer sizes and thermostat contact load; each pole carries full current so that poles are not connected in parallel.

Saw . . .

. . .designed as integral unit with self contained electric motor—*R. C. S. Tool Corp., Dept. HPAC, P. O. Box* 661, *Bloomington, Ill.*

With motor rated 5 amp, ½ hp, 2500 strokes per min. Unit includes metal carrying case, six blades, blade wrench.



Machine Screw Anchor . . .

. . .formulated to be soft enough for complete caulking, hard enough for good holding power—*Rawlplug Co., Dept. HPAC,* 210 *Petersville Rd., New Rochelle, N.Y.*

"Rawl-Calk-In" sleeve cast of "Rawloy," company's alloy with lead especially developed for masonry anchors.

these "Extras" in CHICAGO PUMPS mean

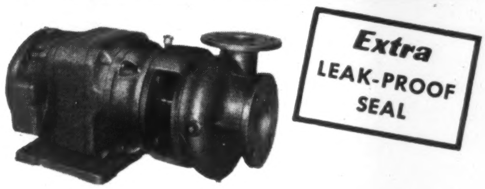
Longer, Better Performance
Lower Cost Operation
and Installation

Extra
POSITIVE
CLOG-PROOF
SEWAGE
HANDLING
CHICAGO PUMP CO

FLUSH-KLEEN Sewage Ejector TYPE "S"

The Flush-Kleen Sewage Ejector can't clog because only liquid is handled by the impeller. Coarse matter is strained out, then backwashed from the strainer into discharge pipes. No strainer baskets to clean, no repairs due to clogging, no foul basins because solids never reach the wet basin. Besides being easier to maintain, Flush-Kleens last longer and require less power. Write for details in Bulletin 122C.

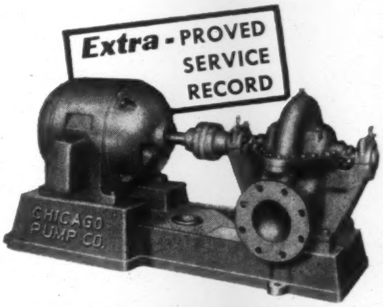
A COMPLETE LINE FOR EVERY BUILDING SERVICE



NEW F-C AND C-C PUMPS EITHER FLEXIBLE-COUPLED OR CLOSE-COUPLED

Compact, smooth running, quiet, — ceramic faced seal is highly resistant to wear — for circulating and booster service. Heads from 10 to 190 feet, capacities from 5 to 400 gpm. Bulletins 107 and 108.

SEE US AT THE 13th INTERNATIONAL HEATING & AIR CONDITIONING EXPOSITION, BOOTH 30, FEB. 25 to MARCH 1, 1957 — INTERNATIONAL AMPHITHEATRE, CHICAGO, ILLINOIS



DOUBLE SUCTION HORIZONTALLY SPLIT CASE PUMP

Accurately machined and fitted revolving parts in carefully cast casing. Have proved reliable for house pump, circulating and booster service. See Bulletin 101.

Extra - LOW
INSTALLATION
COST
CHICAGO PUMP CO

TYPE AVC CONDENSATION PUMP AND RECEIVER

Low inlet — no elaborate foundation needed for installation—for systems to 10,000 EDR and 10-30 psi. See Bulletin 245.

Extra - WON'T
STEAM-BIND

SURE-RETURN CONDENSATION PUMP AND RECEIVER

Low inlet — positive head on suction — no friction in manifold between pump and receiver—handles extremely hot condensate without steam binding — for systems to 75,000 EDR and low or medium pressures. See Bulletin 250.

➧ **Write to Department B**

fmc ®

CHICAGO PUMP COMPANY

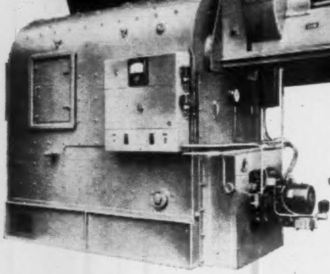
Subsidiary of Food Machinery and Chemical Corporation

BUILDING PUMP DIVISION

622 DIVERSEY PARKWAY • CHICAGO 14, ILLINOIS

Condo-Vac ®, Sure Return ®, AVC, LVC, Fire, House & Circulating Pumps, Pneumatic & Tankless Water Systems . . . Flush Kleen ® Sewage Ejectors, Little Giant ® & Non-Clog Bilge Pumps, Pumps for every Industrial use.

More Steam
Faster and Cheaper
plus
Convertibility to
Coal Firing

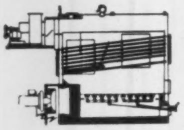


... International
Water Tube
Package Boilers

Combine the proven advantages and economies of International water tube boiler design ...

- Ample Furnace Volume—low heat release rates
- Reserve Capacity Always Available
- Maximum Heat Absorption—quick steaming
- Induced Draft—quiet operation

with fully coordinated burner and controls, and you have an International Water Tube Package Boiler



Shipped as a complete unit for oil, gas or combination firing, this firebox boiler can be easily converted to coal firing at any time.

International Package Boilers can also be shipped, less burner and controls, for installation by local contractors in accordance with International's package boiler specifications.

Get the full story on International Water Tube Package Boilers. Write today for Bulletin 600.

Exclusive territories open to experienced sales organizations. Write stating qualifications.

IBW BOILER BUILDERS SINCE 1886

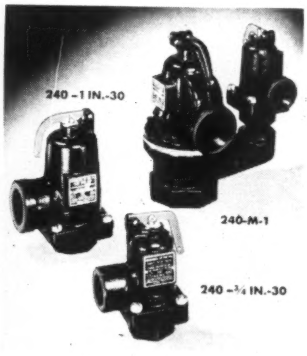
THE INTERNATIONAL BOILER WORKS CO.

810 Spruce St. East Stroudsburg, Pa.

Steel Firebox Heating & Power Boilers
Low & High Pressure Water Tube Package Boilers • International-LaMont Forced Recirculation Generators • ASME Code Pressure Vessels & Welded Products.

EQUIPMENT DEVELOPMENTS

Continued



Pressure Relief Valves ...

... for hot water space heating boilers—*McDonnell & Miller, Inc., Dept. HPAC, 3500 N. Spaulding Ave., Chicago 18.*

Units conform to ASME boiler code. "230" and "240" (shown) series include five individual valves, three manifold types. Inlets range ¾ to 2 in., outlets ¾ to 1½ in. Rated for boiler outputs 303,000 to 1,928,400 Btu per hr.

Room Air Conditioners ...

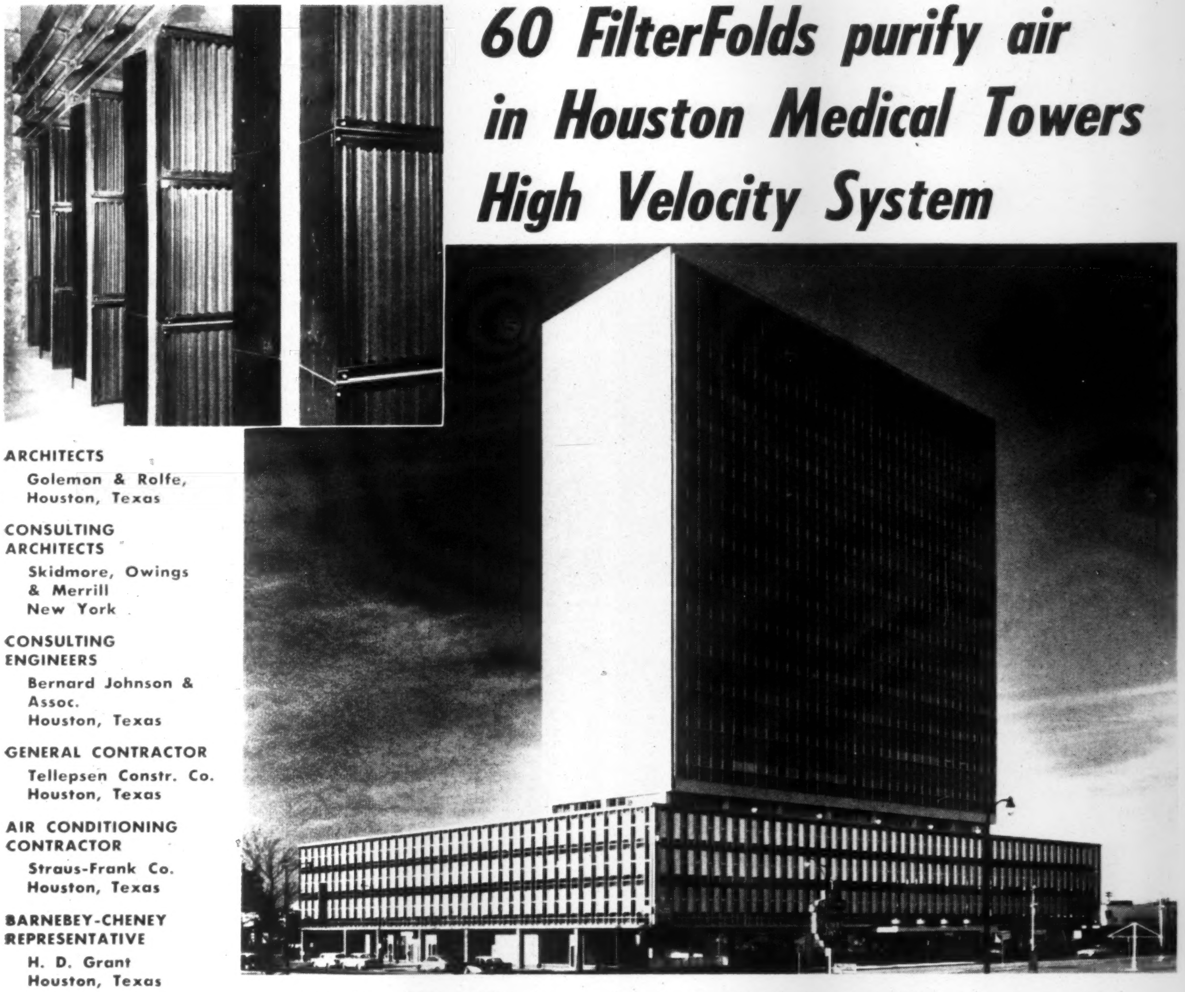
... in new 1957 line—*Airtemp Div., Chrysler Corp., Dept. HPAC, 1600 Webster St., Dayton 1, Ohio.*

In three cabinet designs—one for conventional double-hung windows, one for casement windows, "wall-thin" design said to permit either in-the-wall or in-the-window location. Capacities of various models range ½ to 2 hp.

Concrete Hole Saw ...

... designed to cut clean holes through reinforced concrete without unnecessary noise—*J. F. Hamlin Co.,*

60 FilterFolds purify air in Houston Medical Towers High Velocity System



ARCHITECTS
Golemon & Rolfe,
Houston, Texas

CONSULTING ARCHITECTS
Skidmore, Owings
& Merrill
New York

CONSULTING ENGINEERS
Bernard Johnson &
Assoc.
Houston, Texas

GENERAL CONTRACTOR
Tellepsen Constr. Co.
Houston, Texas

AIR CONDITIONING CONTRACTOR
Straus-Frank Co.
Houston, Texas

BARNEBEY-CHENEY REPRESENTATIVE
H. D. Grant
Houston, Texas

Just What the Doctor Ordered, this air purifying system in Houston's newest and finest office building for physicians, dentists and related services. Air is supplied by two primary fans on the top floor, each capable of 87,000 cfm total air. Of the total, 74,000 cfm is recirculated. Each primary air unit has a V-bank of 30 Barnebey-Cheney activated charcoal FilterFold air purifiers. The system is designed so 40% of the return air will pass thru the FilterFolds. Total air conditioning refrigeration is 600 tons.

This system underscores again that true air conditioning must include air purification as well as heating or cooling.

BARNEBEY-CHENEY CO.

Columbus 19, Ohio
St. Johns, Quebec

See our air purification equipment demonstrated at the Heating & Air Conditioning Exposition, Booth 1046.

BARNEBEY-CHENEY CO. Columbus 19, Ohio

Please send information on air purification with activated charcoal

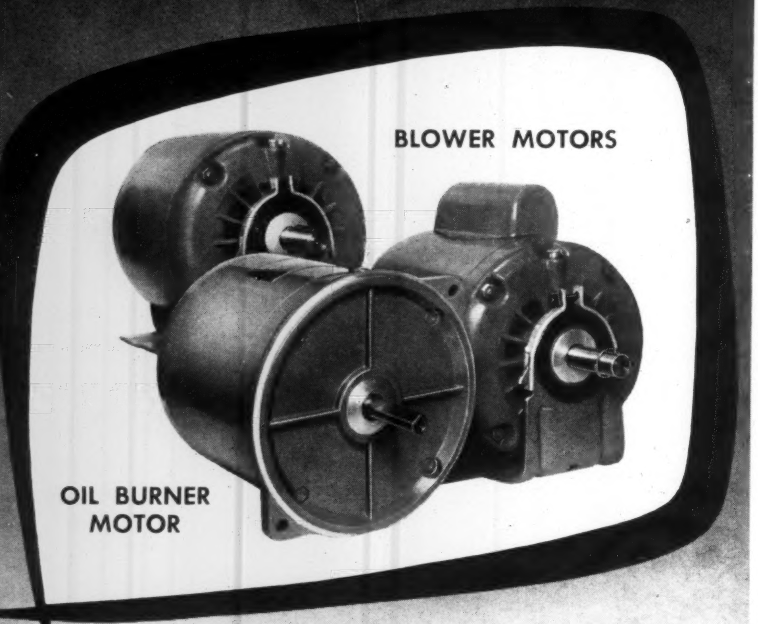
My Name ....

Address ....

City .... State ....

I am: ☐ Contractor ☐ Cons. Engr. ☐ Equip. Mfg. ☐ ____________

MARATHON ME ELECTRIC
HEATING
AIR CONDITIONING
MOTORS



A COMPLETE LINE
OF EXPLOSION PROOF
MOTORS AVAILABLE
ALL CARRY THE
LABEL

FOR
UNIT HEATERS ....OIL BURNERS
BLOWERS ....COMPRESSORS
VENTILATORS ....PUMPS
COOLING TOWERS..................... etc.

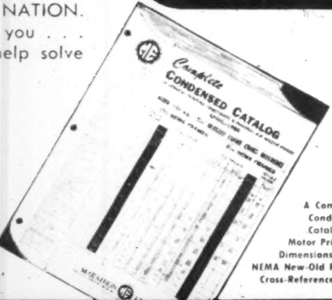
- EXPERIENCE . . . PROVEN PERFORMANCE. There is no substitute for the reliability of proven performance . . . Top Names of the Nation's Industry have proven ME performance in PRODUCING QUALITY PRODUCTS.
- VERSATILITY . . . WIDE RANGE OF DESIGN. Single Phase . . . Polyphase . . . Direct Current NEMA Standard . . . or Special Design ME can design to meet your special specifications.
- SERVICE . . . THROUGHOUT the NATION. There is an ME District Office near you . . . Call our Sales Engineer TODAY to help solve your motor problem.

MOTORS
1/20 HP thru
2500 HP

GENERATORS
1/2 KW thru
2000 KW

Yours for the Asking

WRITE DEPT. 21,
WAUSAU, WIS.



A Complete
Condensed
Catalog of
Motor Prices &
Dimensions with
NEMA New-Old Frame
Cross-Reference List

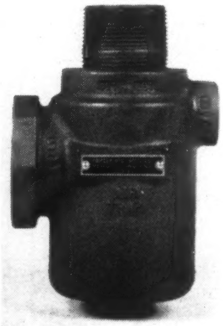
SINCE 1913
MARATHON ME ELECTRIC
HOME OFFICE AND FACTORY, WAUSAU, WIS.
FACTORIES AT ERIE, PA. AND EARLVILLE, ILL.
SALES OFFICES IN PRINCIPAL CITIES

EQUIPMENT DEVELOPMENTS

Continued

Inc., Dept. HPAC, 746 Ellis St., San Francisco 9.

Also saws holes through marble, granite, tile and steel — fast, clean and quiet, says company. Weighs 160 lb. Feeds automatically. Operates in any position vertical to horizontal.



Air Trap . . .

. . . engineered for horizontally tapped hot water heating boilers—*Triplex Heating Specialty Co., Inc., Dept. HPAC, Peru, Ind.*

Operates as follows: water leaves boiler entering body casting of trap, is directed to bottom of casting. Is then carried upward through nipple into heating system. Air is entrapped between outside casting and nipple extension extending near bottom of casting. Entrapped air is piped to expansion tank from ½ in. tapping.

Plastic Pipe, Tubing . . .

. . . in rigid polyvinyl chloride, flexible polyethylene types—*Marken Plastics Corp., Dept. HPAC, 2724 E. 55th St., Los Angeles.*

Range of sizes ⅜ to 4 in., with all types of fittings to be offered, says company.

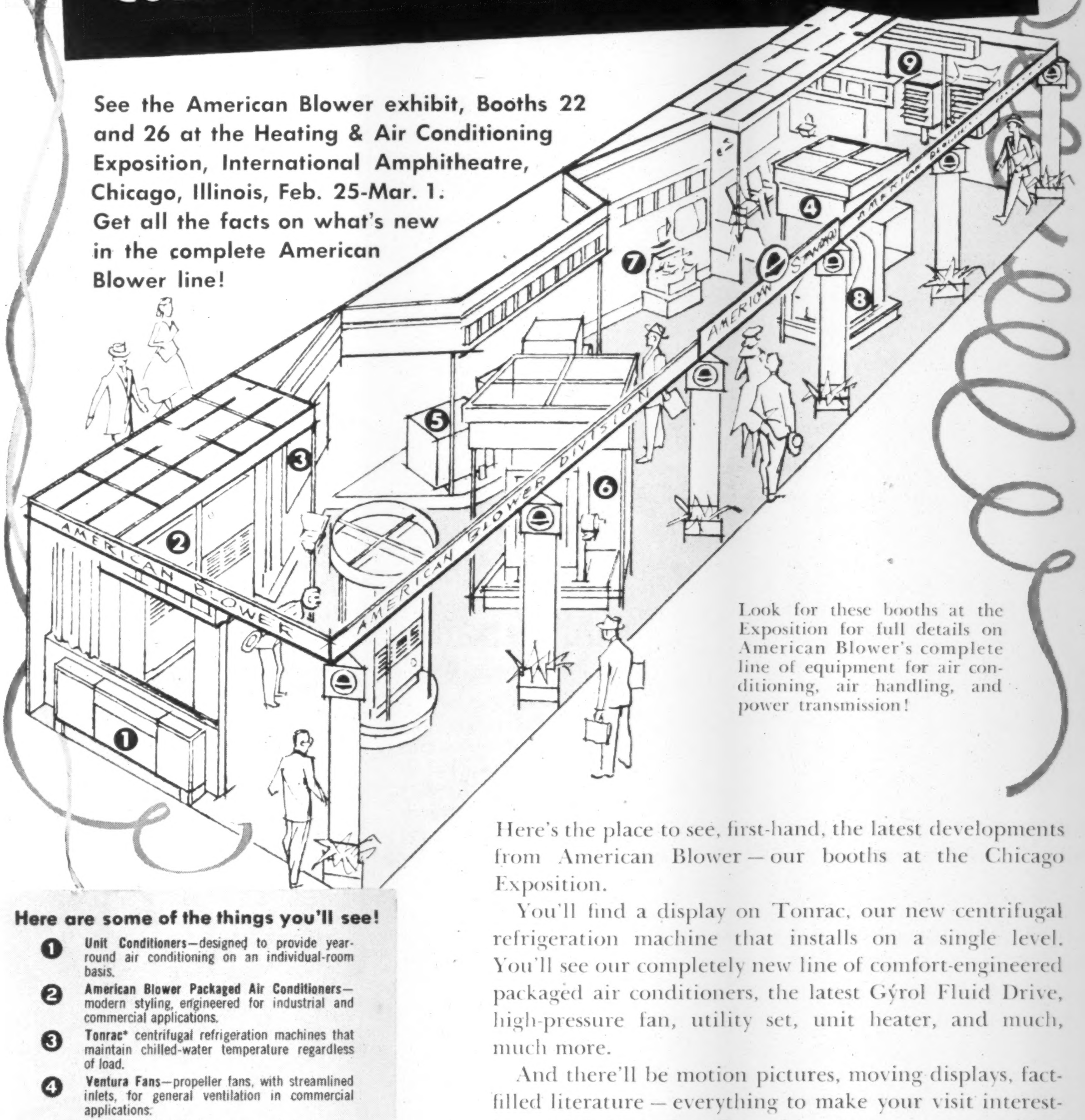
Air Conditioning Units . . .

. . . in 2, 2½, 3 ton sizes—*International Mfg. Co., Air Conditioning Div., Dept. HPAC, 600 E. Grand Ave., Oklahoma City.*

In four models designated ceiling hideaway, ceiling enclosed, console hideaway, console enclosed.

Come visit us at the Exposition!

See the American Blower exhibit, Booths 22 and 26 at the Heating & Air Conditioning Exposition, International Amphitheatre, Chicago, Illinois, Feb. 25-Mar. 1. Get all the facts on what's new in the complete American Blower line!



Look for these booths at the Exposition for full details on American Blower's complete line of equipment for air conditioning, air handling, and power transmission!

Here are some of the things you'll see!

① **Unit Conditioners**—designed to provide year-round air conditioning on an individual-room basis.

② **American Blower Packaged Air Conditioners**—modern styling, engineered for industrial and commercial applications.

③ **Tonrac*** centrifugal refrigeration machines that maintain chilled-water temperature regardless of load.

④ **Ventura Fans**—propeller fans, with streamlined inlets, for general ventilation in commercial applications.

⑤ **Air-Conditioning Units**—components for central station air-conditioning systems.

⑥ **Sirocco High-Pressure Fans**, for high-velocity direct air-conditioning systems and industrial applications.

⑦ **GYROL® Fluid Drives** for smooth power and adjustable-speed control in a wide variety of industrial applications.

⑧ **Utility Sets**—self-contained fan units for general supply or exhaust where duct work is required.

⑨ **Unit Heaters**—horizontal and vertical models for use with steam or hot water, plus gas-fired heaters.

*Trademark

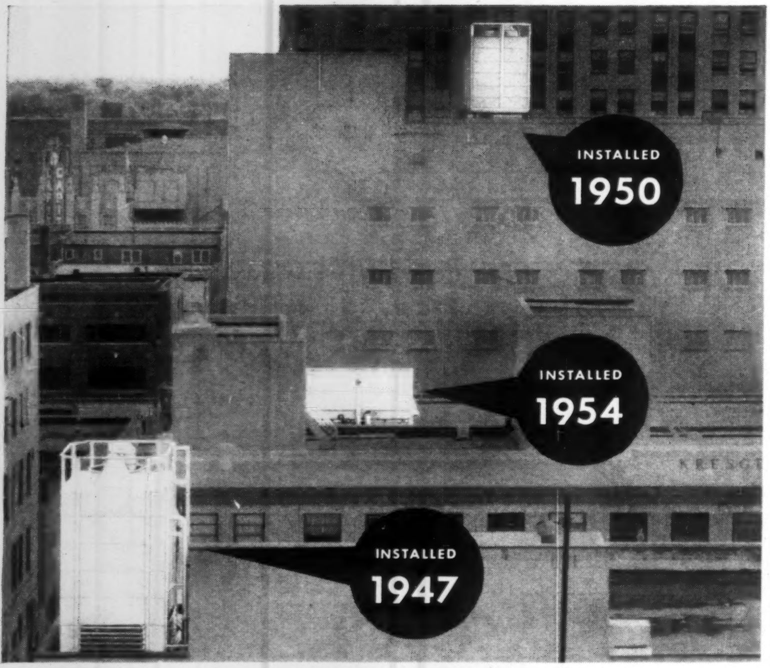
Here's the place to see, first-hand, the latest developments from American Blower—our booths at the Chicago Exposition.

You'll find a display on Tonrac, our new centrifugal refrigeration machine that installs on a single level. You'll see our completely new line of comfort-engineered packaged air conditioners, the latest Gýrol Fluid Drive, high-pressure fan, utility set, unit heater, and much, much more.

And there'll be motion pictures, moving displays, fact-filled literature—everything to make your visit interesting and informative. So make a note now to stop by! American Blower Division of American-Standard, Detroit 32, Michigan. In Canada: Canadian Sirocco products.

AMERICAN BLOWER

Division of **AMERICAN-Standard**



Located side by side, three major Flint, Michigan, department stores employ Binks cooling towers to help maintain store temperatures at 71°

3 cooling towers, 1 story... high performance-low maintenance

These 2-K and 3-B Series Binks cooling towers give good service with practically no maintenance, according to the service engineers for the stores.

What makes Binks cooling towers dependable performers?

High Efficiency. Binks patented Roto-jet spray nozzles plus internal redwood decking assure a thorough water break-up. Scientifically balanced air-to-water ratio gives high cooling efficiency under all climatic conditions.

Minimum Maintenance. All parts are built to Binks rigid specifications. Panels and structural framework are heavily galvanized and coated. Blowers for 3-B towers are hot-dipped galvanized; 2-K Series fans are corrosion-resistant aluminum alloy. All parts are designed for easy erection and access—factors appreciated by those who assemble and maintain them.

Send for complete data

Write direct to the address below for Bulletins 477 and 333 describing 2-K or 3-B Series towers. Binks engineers will gladly study your needs and help you select the right tower from a complete line of mechanical and natural draft units.

649

Binks
EVERYTHING FOR WATER COOLING

A COMPLETE LINE OF NATURAL DRAFT AND MECHANICAL DRAFT COOLING TOWERS AND INDUSTRIAL SPRAY NOZZLES

Binks Manufacturing Company
3118-38 Carroll Ave., Chicago 12, Ill.

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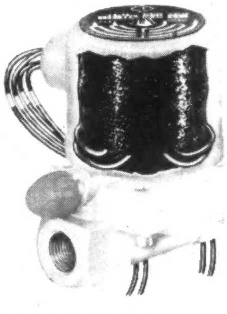


Solenoid Valves . . .

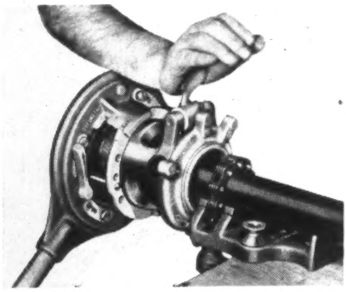
. . .for flow control of water, fluorinated hydrocarbon refrigerants (Nos. 12 and 22), industrial coolants, brines, etc.—*Jackes-Evans Mfg. Co., Dept. HPAC, 4427 Geraldine Ave., St. Louis* 15.

In 42 different valve styles, capacities, with any one of seven electrical circuits. Port sizes range 7/64 to 1½ in. Rated 1 to 250 psi, zero to 225 F.

Air Conditioners . . .

. . .with replaceable fabric front—*Amana Refrigeration, Inc., Dept. HPAC, Amana, Iowa.*

With decorator fabric front that may be replaced to match any decor, unit is feature of company's 1957 line. Other new models include: "wall-thin" units 15½ in. deep and 17 in. high; two 1 hp units that operate on 115 volt lines. Other models available rated ¾ to 2 hp.



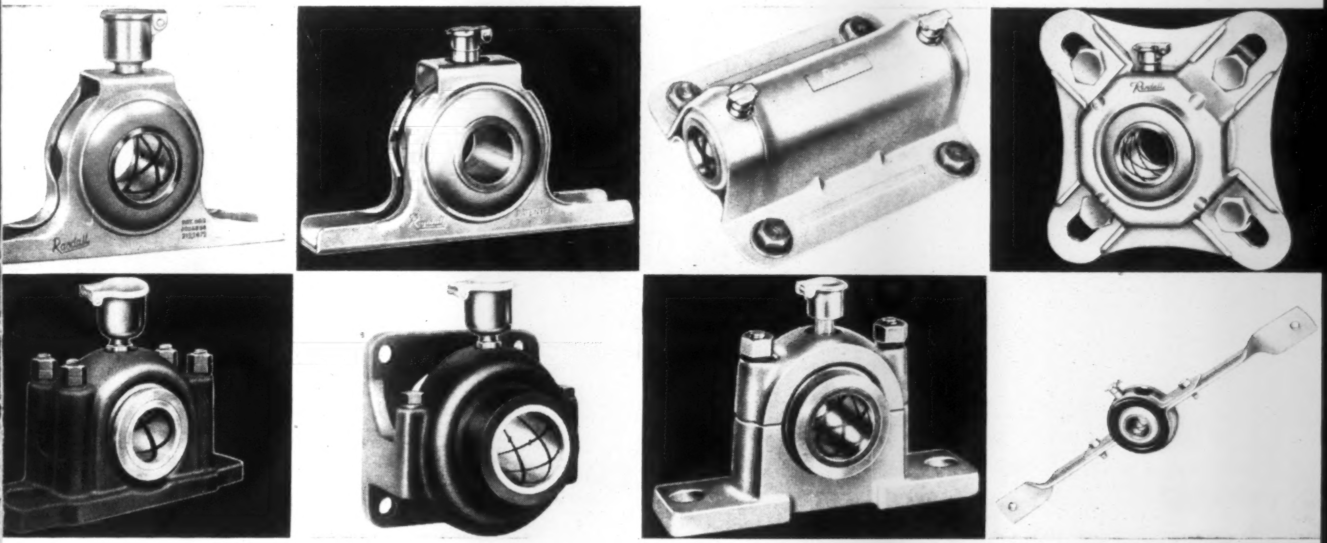
Pipe Threader . . .

. . .with "True-Centering Workholder" feature—*Ridge Tool Co., Dept. HPAC, Elyria, Ohio.*

Is said to facilitate straight, true threads. All three jaws close at one

Randall

leading developer and manufacturer of the air moving industry's most dependable bearings



There's a Quiet...Self-Aligning...Self-Lubricating Randall Sleeve Bearing Assembly for Every Type Application

Controlled automatic lubrication . . . outstanding efficiency . . . and extended periods of operation without maintenance are the advantages Randall Bronze Sleeve Bearing Pillow Blocks provide for every type of application. This superior performance is the result of Randall's exclusive design and manufacturing skill.

There are no moving parts in the Randall bearing assembly. The "DEEP-WELL"® lubricant reservoir feeds the proper lubrication to all parts of the bearing surface through porous graphite plugs and grooves. This combination of oil and graphite lubrication in just the right quantity for any operating condition provides a perfect non-metallic cushion between the shaft and bearing surface so that the shaft spins smoothly and silently. Alignment of the bearing assembly with the shaft is automatic and remains so under all normal operating conditions.

Randall Pillow Blocks are compact, completely assembled units —supplied ready for installation. They are economical with their initial low cost plus quicker, easier installation.

The pillow blocks illustrated are representative of the complete Randall line. Randall Pillow Blocks are available for mounting in any position and with a variety of bronze bushings to meet all application requirements. The Randall "DEEP-WELL"® ball assembly, the heart of every Randall Pillow Block, may be purchased separately for use with a housing of your own design. Randall also supplies mounting grommets, safety collars and washers.

Your nearby Randall distributor, working with our engineers, can provide expert help in solving bearing problems. You'll find his name listed in the yellow pages of the telephone directory under "Bearings." Call him today.

On Display Booth 310 International Amphitheater

Randall

SINCE 1906

USE THIS COUPON TO SEND FOR LITERATURE

Just clip this coupon to your letterhead and send it to Randall Graphite Bearings, Inc. We will send you the complete catalog on Randall Pillow Blocks.

RANDALL GRAPHITE BEARINGS, INC.

1012 S. Greenlawn Ave. **Lima, Ohio**

RG1

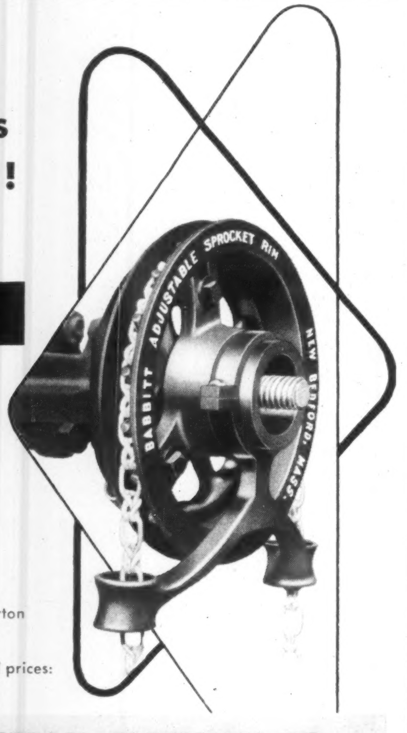
I'm Warm-air *I'm Cool-air*

I'm Electro-air....

and I'll see you at
BOOTH 702

"I'll show you the latest in electronic air cleaners featuring a single ballasted circuit and selenium rectifiers which assure trouble-free operation and high efficiency. You will see the complete line of Electro-air residential, commercial and industrial equipment — the ONLY electronic air cleaners having a 5 YEAR PARTS GUARANTEE."

ELECTRO-AIR
ELECTRO-AIR CLEANER COMPANY
1285 REEDSDALE STREET, PITTSBURGH 33, PA.



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REACH for

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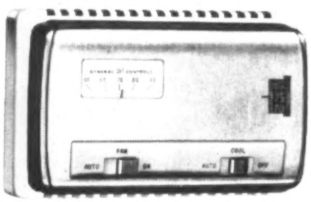
Adjustable
SPROCKET RIM
with Chain Guide

- Eliminate dangerous catwalks, ladders, balconies, boxes, stools, etc.
- Prevent accidents, protect personnel
- Reach inaccessible areas easily
- Operate every valve from plant floor
- Easy to install and operate
- No maintenance; first cost, *only* cost
- Easy instructions with each unit
- Packed, completely assembled, one to a carton
- Fits any size valve wheel
- Your supplier carries complete stock
- Write for new descriptive Catalog sheet and prices:

Babbitt STEAM SPECIALTY CO.
8 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

time. User presets cam plate to desired pipe size which adjusts all three jaws in single action. Jaws tighten as three-jaw action is continued by pump of palm of operator's hand on forged cam lever.



Room Thermostat . . .
. . .with modern styling—*General Controls Co., Dept. HPAC, 801 Allen Ave., Glendale 1, Calif.*

Designed to have slim silhouette, "horizontal look." For heating, cooling and combination heating/cooling applications.

Water Conditioning . . .
. . .device designed to combat hard water scale, corrosion—*Packard Water Conditioner Div., Inc., Dept. HPAC, Jacksonville, Fla.*

Operates without chemicals, has no moving parts, requires no servicing or maintenance, says company. Unit looks like section of heavy piping with bulge at top. Has two parts: dispersing cell containing kinetic energy generator; homogenizing chamber. Together, units impart added energy to atoms of water solution to prevent scale from forming, gradually dissolve scale already existent, says company.

Fastening Tool . . .
. . .designed for fastening through narrow or restricted areas into concrete, cinder block, brick, etc.—*Hilti Rapid Fastening Systems, Inc., Dept. HPAC, 55 Vandam St., New York 13.*

Recommended by company to heating, ventilating installers. Unit is hammer actuated type.

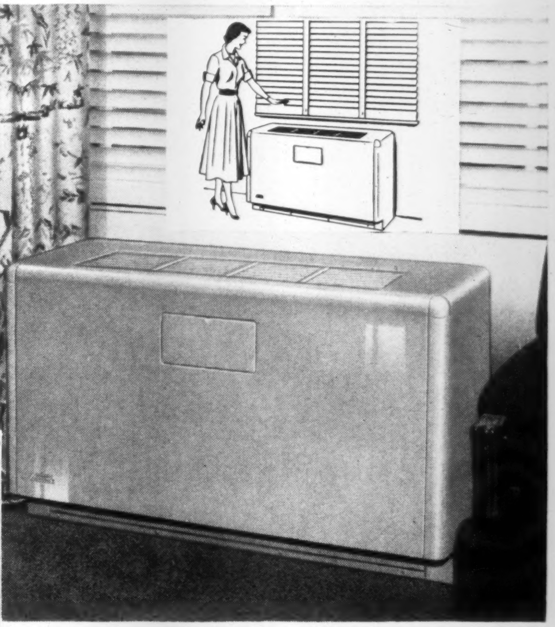
MUELLER CLIMATROL PLANNING AIDS . . .
. . . CLIMATE CONTROL FOR HEALTHFUL LIVING

New approach to all-season air conditioning

Hailed as Budget-Minding Wonder

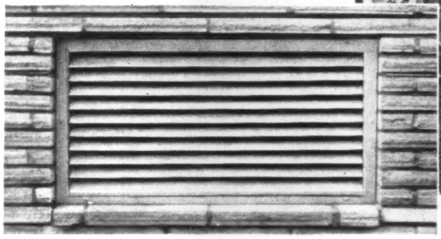
MUELLER CLIMATROL recessed, year-round room air conditioners cost about one third less to install . . . 20% less to operate than central cooling alone. The most economical way to bring all-season comfort to commercial or institutional buildings — they heat with existing steam or hot water, cool with their own efficient cycle . . . offer individual thermostatic comfort control, room by room. And they use no water.

These new units typify the progress-pacing creative engineering that has marked Mueller Climatrol's 100 years in business.



Each handsome, recessed unit offers tremendous versatility . . . heats, cools and dehumidifies.

Attractive, stainless steel louvre opening fits flush to outside of building. Allows for ventilating with fresh, outdoor air . . . exhausting of stale, indoor air.



Chicago's world-famous Edgewater Beach is one of several hotels to take advantage of this big new idea in all-season comfort. Note! Installation can be scheduled room-at-a-time on a rotative basis so tenants aren't disturbed.

CENTENNIAL YEAR CELEBRATION IN '57 will include new, functional ideas for you from Mueller Climatrol. Write today for complete details on budget-minding, year-round room air conditioners . . . and for free anniversary booklet.

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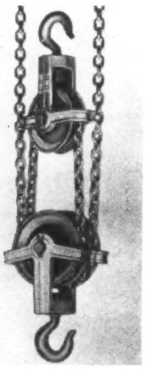
4201 Belmont Ave., Chicago 41, Ill.

EQUIPMENT DEVELOPMENTS

Continued



Differential Hoist . . .

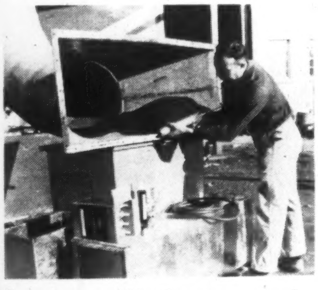
. . . with 1000 lb capacity—*Thern Machine Co., Dept. HPAC, Winona, Minn.*

Is said to save to 25 percent of pull necessary to operate because of incorporation of anti-friction needle bearings in lower sheave. Recommended by company for multiple lifting jobs. Weighs 29 lb.

Ion Exchanger Cleaner . . .

. . . for water treatment with zeolite, other cation exchangers—*W. H. & L. D. Betz, Dept. HPAC, Gillingham and Worth Sts., Philadelphia 24.*

Formulated to aid in cleaning zeolite bed, decreasing pressure drop caused by fouling, restoring softening capacity. May also be used to keep zeolite clean—preventing future fouling, says company.

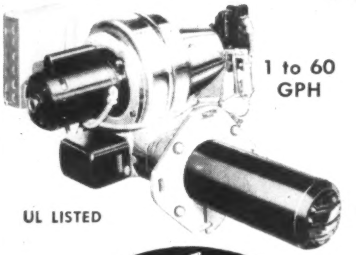


"Neoprene" Compound . .

. . . formulated to self-cure to form gasket—*Gates Engineering Co., Dept. HPAC, 100 S. West St., Wilmington 99, Del.*

Gun applied, can be flowed onto bolted or riveted flanges and lapped metal sheets to seal against air, dirt,

LOOK AT THIS NEW FORCED-DRAFT BURNER THAT DELIVERS BIG PERFORMANCE



OIL
syncro flame
OIL

FOR COMMERCIAL AND INDUSTRIAL INSTALLATIONS

While this burner *looks* like a standard residential type, it is a *big* heavy-duty machine. Features include two-stage fire, built-in controls for pre-purge, post-purge, and high-low-off fire control with automatic air/fuel ratio settings, terminal strips for accessory wiring, and wide ranges of capacities.

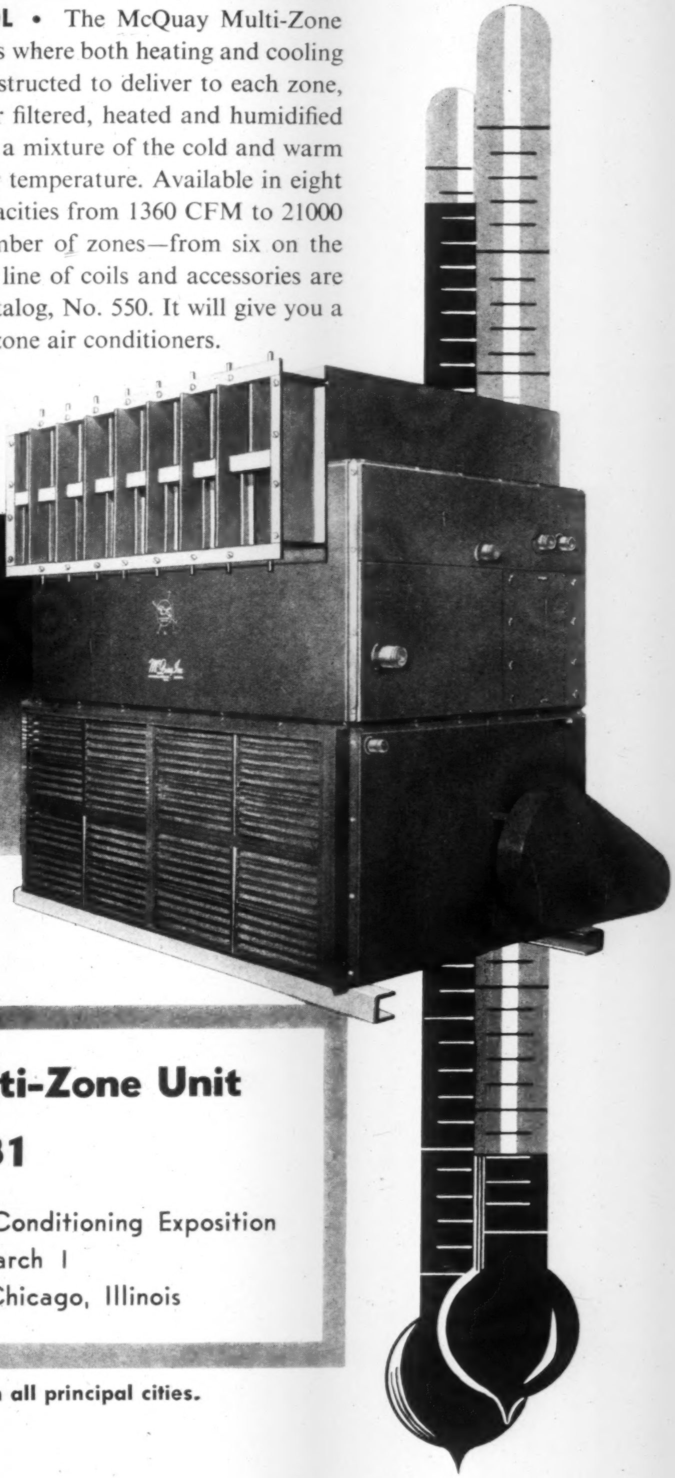
FOR 20 TO 150 H.P. BOILERS
HIGH STACK NOT REQUIRED

SYNCRO/FLAME Pressure Burners are capable of firing efficiently into combustion chamber pressures of 3" of water or more, eliminating the need for high stacks or expensive forced draft equipment. *No ordinary burner can do this!* SYNCRO/FLAME Pressure Burners are available for oil, gas, or dual-fuel service.

DETAILS ON REQUEST
Write today for data sheets describing all features and giving full specifications.

MANUFACTURERS OF OIL AND GAS AND OIL/GAS BURNERS
SYNCHRONOUS FLAME, INC.
WALWORTH • WISCONSIN

COOLING • HEATING • VENTILATING • HUMIDIFYING • DEHUMIDIFYING • FILTERING • ZONE CONTROL • The McQuay Multi-Zone Air Conditioning Unit is designed for buildings where both heating and cooling are required at the same time. The unit is constructed to deliver to each zone, either filtered, cooled and dehumidified air; or filtered, heated and humidified air. By automatic control of the zone dampers a mixture of the cold and warm air is supplied to each zone at the required air temperature. Available in eight sizes in horizontal or vertical models with capacities from 1360 CFM to 21000 CFM. Each "MC" unit has a maximum number of zones—from six on the smallest size to 22 on the largest. A complete line of coils and accessories are available. Write for McQuay's new 12 page catalog, No. 550. It will give you a big assist in planning the installation of multi-zone air conditioners.



Mc QUAY "MC"

HEATS AND OR COOLS

SIMULTANEOUSLY
up to 22 zones from one
Multi-Zone Unit

See the McQuay Multi-Zone Unit

BOOTH 31

13th International Heating and Air Conditioning Exposition
February 25 thru March 1
International Amphitheater, Chicago, Illinois

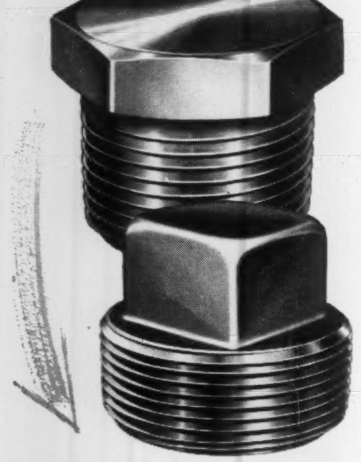
McQuay representatives located in all principal cities.

MAKE THE SEASONS COME TO YOU

McQuay Inc. **1600 Broadway N. E., Minneapolis 13, Minn.**

HEATING • AIR CONDITIONING • REFRIGERATION

plugs for Pressure



forged steel, high pressure plugs with DRY SEAL tapered threads

CAPITOL square head and hex head solid plugs have dry seal tapered threads to assure safe, permanent high pressure installations. Conveniently packaged for easier handling.

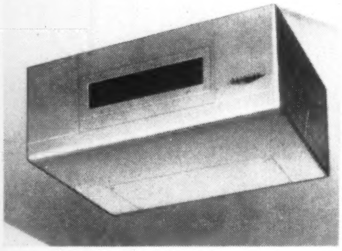
Square Head Solid Plugs sizes 1" thru 2", all forged steel. Hex Head Plugs sizes ½" thru 2" machined from solid bar.

You'll like these thread protectors, too!

CAP CAPITOL
MFG. & SUPPLY CO.
COLUMBUS, OHIO

COUPLINGS — NIPPLES — UNIONS — BUSHINGS — PLUGS — REDUCERS — CAPS—CAPADAPTERS—WELL SUPPLIES

water, oil, corrosive fumes or liquids, says company. Is said to gradually cure into tough, elastic gasket to provide weatherproof seal. For application by hand or special air operated guns.



Air Conditioning Units . . .
. . . for overhead remote ceiling and concealed installation—*Fedders-Quigan Corp., Dept. HPAC, Trenton, N.J.*

Recommended by company for installation in multiroom applications such as hotels, motels, stores, offices, public buildings, hospitals, other installations where floor and wall space is at premium. Use remote sources of circulating hot water in winter, chilled water in summer. Require only supply, return, condensate drain connections, says company.

Portable Gas Torch . . .
. . . designed to meet need for easy-to-handle gas burning equipment in heating, melting, drying, lighting, thawing operations in industrial plant operations, repair and maintenance work—*Hauck Mfg. Co., Dept. HPAC, 124-36 10th St., Brooklyn 15.*

Burns manufactured, mixed, natu-

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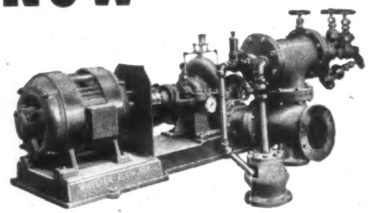

with a
WHEELER-ECONOMY FIRE PUMP

A delay in the planning or completion of your fire protection program may mean loss of life, property or operation. For a complete and effective plan include one or more Underwriters Laboratory and Factory Mutual Fire Insurance Companies approved Wheeler-Economy Fire Pumps.

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Write for catalog L-1

WE-510

C. H. WHEELER
Manufacturing Co.
ECONOMY PUMP DIVISION
19th and Lehigh,
Philadelphia 32, Pa.

SEE OUR EXHIBIT: BOOTH 525
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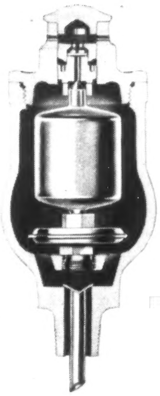
CHICAGO Feb. 25 — March 1.

A well placed air vent can work a heating miracle!



No. 5 Rapid Vent. Float and thermostatic construction. Designed for use at the end of steam mains, tops of risers and other similar locations on vapor and one pipe vacuum systems where the maximum venting requirement does not exceed one cubic foot per minute at 5 psi.

No. 6 Quick Vent. Thermostatic only. Designed for installation at high points in the piping where there is not sufficient room for the No. 5 Vent or where a float is not needed. Same venting capacity as No. 5.

No. 50 Air Vent. Float only. Designed to remove air and gases automatically from hot or cold water tanks, coils or piping, liquid pump systems or similar applications where it is necessary to vent air rapidly. Maximum working pressure, 125 psi.

No. 55 Air Vent. Float and thermostatic construction. Is capable of expelling large volumes of air without passage of water or steam and is designed for use on steam pressure vessels or systems. Maximum working pressure, 125 psi.

No. 7 Air Eliminator. Float and thermostatic construction. Expecially suitable for installation at the ends of steam mains, return piping and tops of risers where it is necessary to expel a large volume of air from the system. Suitable for working pressures up to 15 psi.

In a Wilmette Illinois Building, an outwardly well-engineered vacuum system had been a headache for years. Then, last winter, along came a heating man who quickly sized up the situation and said with real conviction: "Put a Marsh No. 5 Vent right there!"

That did it! One inexpensive vent cleaned up a spotty, erratic condition, that a number of expensive alterations had failed to touch.

Unusual? Not in the least: over the years we have seen a lot of wonders worked by installing the right kind of Marsh air vent in the right spot. A number of these dependable vents are illustrated here . . . products that express an unrivaled accumulation of knowledge in dealing with air venting problems.

Marsh air vents are fully covered by the Marsh Heating Specialty Catalog along with Marsh Traps and Valves. Your local Marsh man will be glad to work with you in applying Marsh Vents effectively.

MARSH HEATING EQUIPMENT CO.
Sales Affilate of Jas. P. Marsh Corporation
Dept. T, Skokie, Ill.
Marsh Instrument & Valve Co. (Canada) Ltd., 8407 103rd Street, Edmonton, Alberta, Canada

MARSH

Quality Heating Specialties since 1865

What are your requirements in industrial thermometers?

- Easy Reading?
- Accuracy?
- Sensitivity?
- Flexibility?
- Ruggedness?

USG GOTHAM

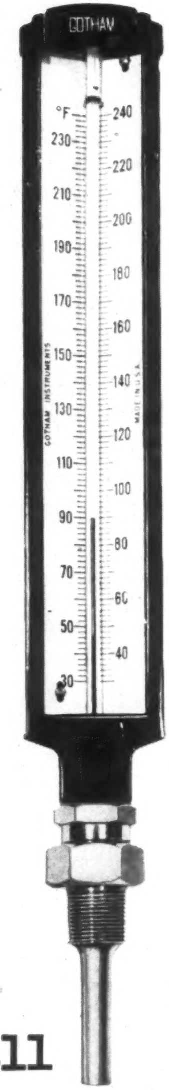
assures them all

The Red-Reading Mercury tube is today a standard for easy-to-read Industrial Thermometers.

USG Gotham Thermometers are built to withstand long, hard usage and maintain maximum accuracy and sensitivity.

They are available for straight mounting, 90° back or side angle, incline or recline and multi-angle mounting. Separate sockets and other accessories can also be furnished when specifications require.

Investigate the Gotham line before you specify. Write for Catalog No. 101.



GOTHAM
INDUSTRIAL THERMOMETERS

UNITED STATES GAUGE

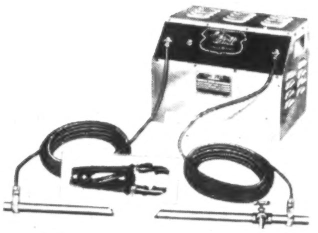
Home of the SUPERGAUGE

Division of American Machine and Metals, Inc.
Sellersville, Pa.

EQUIPMENT DEVELOPMENTS

Continued

ral, propane or butane gas. Operates with compressed air at 40 psi or more. Is said to light immediately without preheating. Generates heat of 2700 F. In five sizes with maximum heat release ratings 325,000 to 1,300,000 Btu per hr.



Pipe Thawer . . .

. . . for use with heating attachment for sweating together copper tubes, pipes—*Trindl Products, Ltd., Dept. HPAC, 1811 S. Clark St., Chicago.*

"Therm-O-Tron," originally designed for pipe thawing, is now year 'round equipment for many soldering, brazing operations, says company.

Aluminized Steel . . .

. . . for use in unit heaters, furnaces at temperatures to 1030 F (plus room temperature)—*Armco Steel Corp., Dept. HPAC, 703 Curtis St., Middletown, Ohio.*

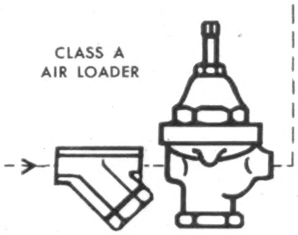
Is said to be increase of 225 F over old maximum permissible temperature. Facilitates smaller, more efficient heating units at lower cost with no sacrifice in Btu output, says company.

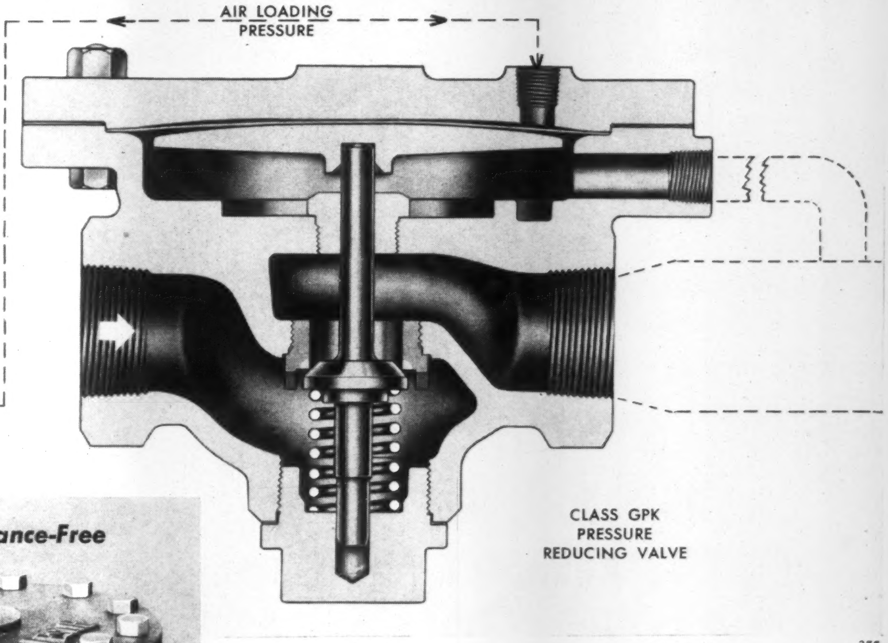
Transformers . . .

. . . engineered to increase voltages from under-voltage circuits to normal —*Dongan Electric Mfg. Co., Dept. HPAC, 2987 Franklin St., Detroit 7.*

For example, "Buck and Boost" units increase 208 volts to 230 volts. Are made to provide 5, 10, or 20 percent boost. Same transformer will also reduce (buck) line voltage by same percentage, says company.

No maintenance inspection on this new valve until 1959!





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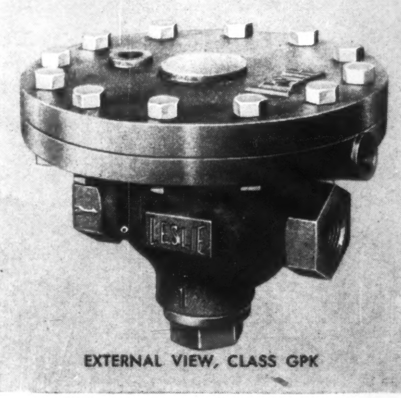
It's Maintenance-Free



EXTERNAL VIEW, CLASS GPK

You can just put this amazingly simple and compact Leslie Class GPK-A pressure reducing valve on the line and forget it for at least 3 years!

HERE IS AN AMAZINGLY SIMPLE air loaded, diaphragm operated, pressure reducing valve that is virtually maintenance-free for steam heat or process steam application.

Only two moving parts and no seals, no stuffing boxes, no small dirt-catching parts — practically nothing can get out of order! And a stainless steel hardened main valve with highly polished finish minimizes wear.

This new Leslie valve instantly feels the effect of any flow change and responds to changes as small as 0.1 psi. It can be adjusted easily from minimum to maximum of reduced pressure range from a remote point, even a thousand or more feet away.

This valve is used in steam process and heating lines. And, its uses are unlimited for any steam reductions within body material limits (250 psi, 450°F).

Ask your Leslie engineer to tell you more about this amazing valve. He's listed in your classified directory under "Valves" or "Regulators".

***guaranteed no maintenance for 3 years.**

Send for Bulletin 561 today.

See this valve demonstrated
and the complete LESLIE line
at Booth 225
13th INTERNATIONAL
HEATING and AIR CONDITIONING
EXPOSITION at
International Amphitheatre
CHICAGO
February 25 - March 1

TRADE
LESLIE
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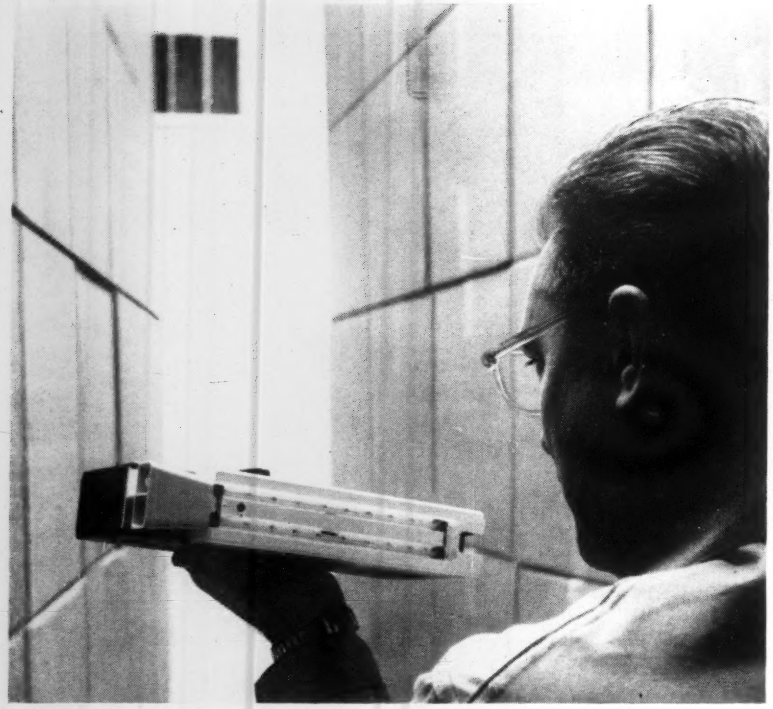
REGULATORS AND CONTROLLERS

LESLIE CO., 237 GRANT AVENUE, LYNDHURST, NEW JERSEY



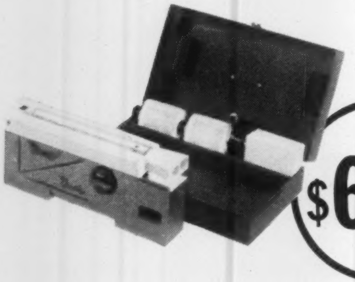
NOW YOU CAN CHECK RELATIVE HUMIDITY ANYWHERE—NO SLINGING OR WHIRLING

This brand-new Bendix-Friez Psychron gives you extremely accurate relative humidity and dew point information with just the flick of a switch. It is a battery-powered portable psychrometer designed and manufactured to meet rigid U. S. Weather Bureau specifications.

Unlike ordinary sling psychrometers, the Bendix* Psychron requires no whirling or special technique to operate. Three standard-size flashlight batteries power a tiny fan that draws air over wet and dry bulb thermometers at a rate exceeding 15 F.P.S. As a result, the Psychron can be safely used in close quarters. It has a special thermal shield to avoid radiation effects for use in bright sunshine and built-in illumination for use in dark or poorly lighted areas.

Order direct from us or through our nearest dealer. For further information write: Bendix-Friez, 1494 Taylor Ave., Baltimore 4, Maryland.

*REG. U.S. PAT. PEND.



$68.50

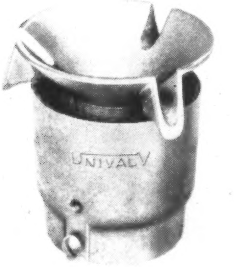
Price includes metal carrying case, nylon neck strap, psychrometric slide rule, 1-oz. plastic water bottle and instruction book containing humidity and dew point tables.

Friez Instrument
DIVISION

Bendix
AVIATION CORPORATION

EQUIPMENT DEVELOPMENTS

Continued



Air Vent . . .

. . . designed to eliminate dangers of accumulating vapors in underground storage tanks by permitting vapor to escape easily in upward direction—*Universal Valve Co., Dept. HPAC, 611 South St., Elizabeth, N. J.*

Is said to eliminate hazards of fire, explosion possible with down vented gasoline vapors. Three-piece construction includes hood, screen, body—assembled with single center screw. In 1½, 2 in. sizes.

Room Air Conditioners . . .

. . . with compact, streamlined construction—*Whirlpool-Seeger Corp., Dept. HPAC, St. Joseph, Mich.*

1957 models feature low, slim silhouette, says company. Are said to be slim enough to practically fit between inner, outer walls. Line includes 16 models. One model features electronic filter designed to hold foreign particles as small as 1/25,000 in. Other units feature flexible air direction control, two fan speeds. In models ¾ to 2 hp.

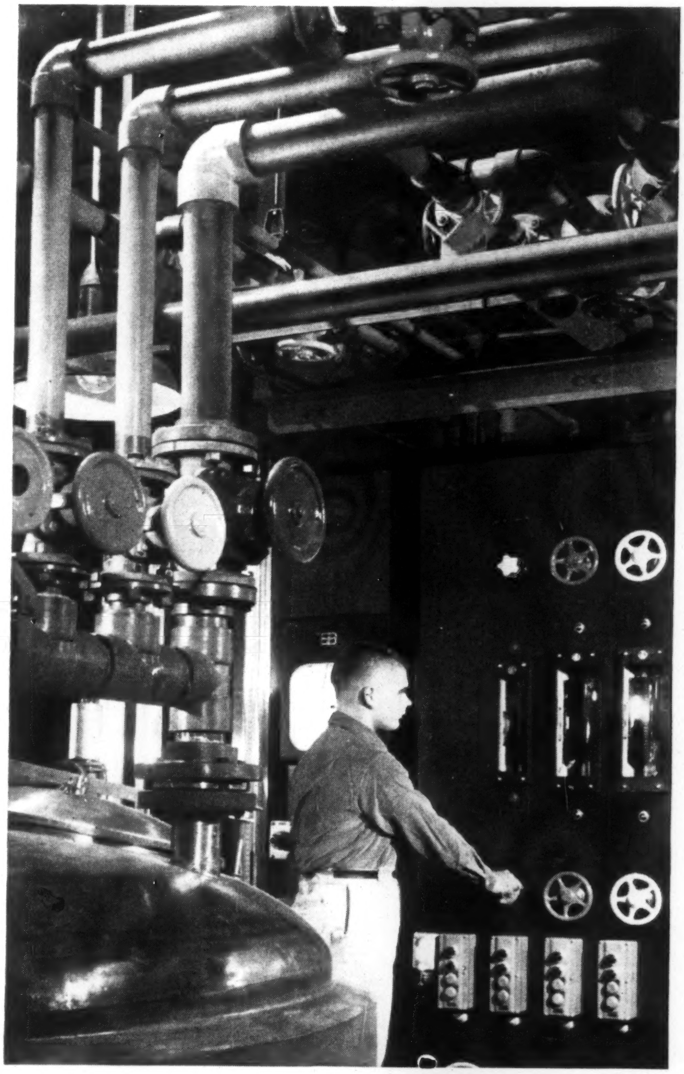
Power Tools . . .

. . . designed to provide 1600 to 1800 impacts per min—*Portable Electric Tools, Inc., Dept. HPAC, 320 W. 83rd St., Chicago 20.*

"Model 7000" uses specially designed "Neoprene" rubber accumu-

Another new development using

B.F.Goodrich Chemical ***raw materials***



purity was the problem... GEON VINYL solved it!

SINCE the fine chemicals processed in this plant react with metallic piping, and thus acquire impurities, a new material was needed.

Piping made from Geon rigid vinyl resin was the logical solution. This durable pipe does not react with the chemicals it carries. It offers superior resistance to oils, acids, alkalis, and most chemicals.

Rigid vinyl pipe of Geon was the *economical* solution too. It weighs only one-fifth as much as steel pipe of similar size, simplifying handling and shipping. It's easily installed, since pipe and fittings are joined quickly with solvent cement.

Geon is a remarkably diverse family of polyvinyl materials . . . star performers for rigid products like piping, valves, housings . . . flexible wall coverings, weatherstripping, foam products . . . coatings for steel, paper, or textiles. One member of the Geon family can surely help *you* make a better product, offer a better value. For information write Dept. DN-1, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Rigid vinyl piping *at the Rebeis Company, Inc., Berkeley Heights, N. J., handles fine chemicals used in many leading pharmaceutical and cosmetic products. Pipe and fittings for this installation were manufactured by Alpha Plastics Inc., Livingston, N. J.*

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Polyvinyl Materials

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B.F.Goodrich **GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors**

If you can reach it,
you can fasten it
with *Ramset*®

One-hand operation in awkward places is simple with a light RAMSET powder-actuated tool. It's ideal for ladder and scaffold work.

For anchoring to concrete or steel, the new DUO-JOBMASTER® sets ¼″ and ⅜″ fasteners interchangeably—merely by switching barrels right on the job! Yet the tool does not change size or weight!

There's no need to exert physical power when you use RAMSET. Let the power charge do the work! No wires, no hose to drag or untangle. RAMSET is entirely self-contained.

Tough jobs are now easy with RAMSET. No more drilling, filling, plugging and bolting. RAMSET fasteners are set at the press of the trigger—have greater holding power than old-style methods.

Speed your production, make work easier for operators, cut your costs, get more dependable performance by using RAMSET whenever fastening to concrete, steel or other hard materials.

Write for free new catalog, ready for you now.

companion tool

Shure-Set
TRADEMARK

Baby brother to RAMSET, this hammer-in tool uses no cartridge, but makes your own hammer power more effective. For masonry, mortar joints, cinder block. Ask for literature.

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WINCHESTER-WESTERN DIVISION
OLIN MATHIESON CHEMICAL CORPORATION

12109-B BEREA ROAD • CLEVELAND 11, OHIO

EQUIPMENT DEVELOPMENTS

Continued

lator to impart striking force. Feature eliminates use of cams, springs, etc.; gives long service life, says company. Unit is adjustable torque, finger tip control, ½ in. square drive type. Develops ¼ hp.

BARWORTH INC

Valve . . .

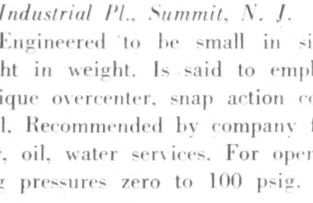
. . . for three-way, two-position service—*Barworth, Inc., Dept. HPAC, 7 Industrial Pl., Summit, N. J.*

Engineered to be small in size, light in weight. Is said to employ unique overcenter, snap action control. Recommended by company for air, oil, water services. For operating pressures zero to 100 psig.

Air Filter Panel . . .

. . . engineered to require no oil, clean in cold water, be light in weight—*Air-Maze Corp., Dept. HPAC, 25000 Miles Rd., Cleveland 28.*

Dry type unit recommended by company for removing lint from recirculated air, applications where oil vapors cannot be tolerated. In 2 in. thick panels—16 × 20, 16 × 25, 20 × 20, 20 × 25 in. sizes.



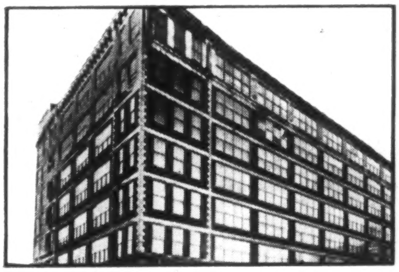
Spiral Nozzles . . .

. . . formulated of "Teflon" in 14 new models—*Bete Fog Nozzle, Inc., Dept.*

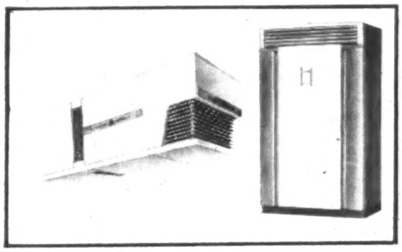
Air Conditioning *at low cost* in a men's clothing factory, with its many batteries of steaming presses, was considered impractical—until General Electric Zone-by-Zone Air Conditioning solved the problem for H. Daroff & Sons, Philadelphia, manufacturers of Botany "500" and Worsted-Tex clothing. Note that General Electric Ceiling-Mounted Units take no floor space—require little or no ductwork.

General Electric Zone-by-Zone Method

selected for world's first fully air conditioned men's clothing plant



H. Daroff & Sons, Phila., first plant of its type to be fully air conditioned – thanks to General Electric Zone-by-Zone method.



CEILING-MOUNTED UNITS (left). Use no floor space – air-cooled and water-cooled.

FLOOR-MOUNTED UNITS (right). May be stationed in space or away from area served.

The H. Daroff and Sons plant is a typical example of how General Electric Zone-by-Zone Air Conditioning fully meets requirements for any type of factory or office building—even overcomes seemingly insurmountable problems. This system is also a sure way to solve budgeting problems. It is easy to install – no costly interruptions – no major alterations – no heavy initial outlay. Its operation is economical, and it minimizes the problem of space.

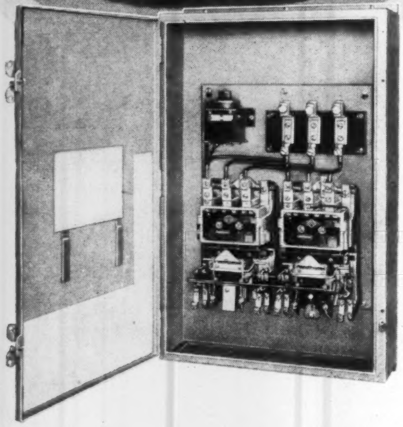
More and more architects are specifying General Electric Zone-by-Zone Air Conditioning as the most practical answer for every requirement. General Electric Company, Commercial and Industrial Air Conditioning Dept., 5 Lawrence St., Bloomfield, N. J.

Progress Is Our Most Important Product

GENERAL ELECTRIC

In Canada, Canadian General Electric Co., Ltd., Montreal

Specify
FURNAS ELECTRIC
CONTROLS for
AIR CONDITIONING
AND REFRIGERATION



Objectionable voltage drops are eliminated by using Furnas Electric Increment Starters for Part Winding motor applications. These starters have won particular acceptance for the larger horsepower air conditioning and refrigeration units.

Increment starting incorporates the advantages of other types of step starting AT THE LOWEST COST IN THE SMALLEST SPACE. Select the size you need: 10, 20*, 30, 40* and 60 hp, 220 volts. There are no costly auto transformers or resistors.

*Major savings with these "in-between" sizes.

FURNAS
25th YEAR

For information on our complete line of air conditioning and refrigeration controls, write for Bulletin 5519. Furnas Electric Company, 1041 McKee Street, Batavia, Ill.

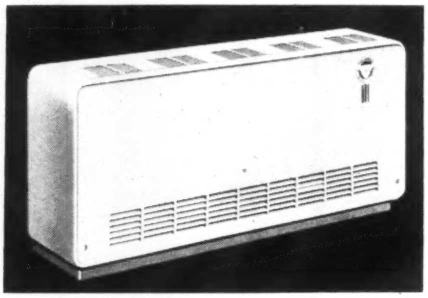
A22

FURNAS ELECTRIC COMPANY
BATAVIA, ILLINOIS

SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

HPAC, 309 Wells St., Greenfield, Mass.

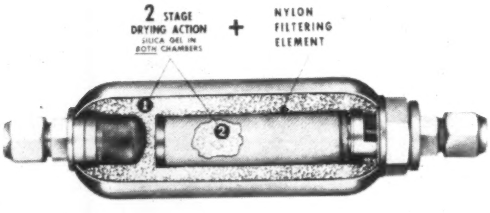
Is now possible to obtain full cone spray patterns, both wide angle (120 deg) and narrow angle (90 deg), in addition to hollow cone models, says company. Wider range of flow rates also available. Series includes nozzles with orifices 1/8 to 1/2 in. diameter with flow rates 2 to 70 gpm.



Electric Unit Ventilator . . .

. . .designed to provide heating, ventilating, natural cooling for schools, churches, conference rooms, offices, theaters, auditoriums, gymnasiums, libraries—*Edwin L. Wiegand Co., Dept. HPAC, 7500 Thomas Blvd., Pittsburgh 8.*

In four models with air deliveries of 500 to 1250 cfm. Is said to provide fast response to room's changing requirements.



Filter Driers . . .

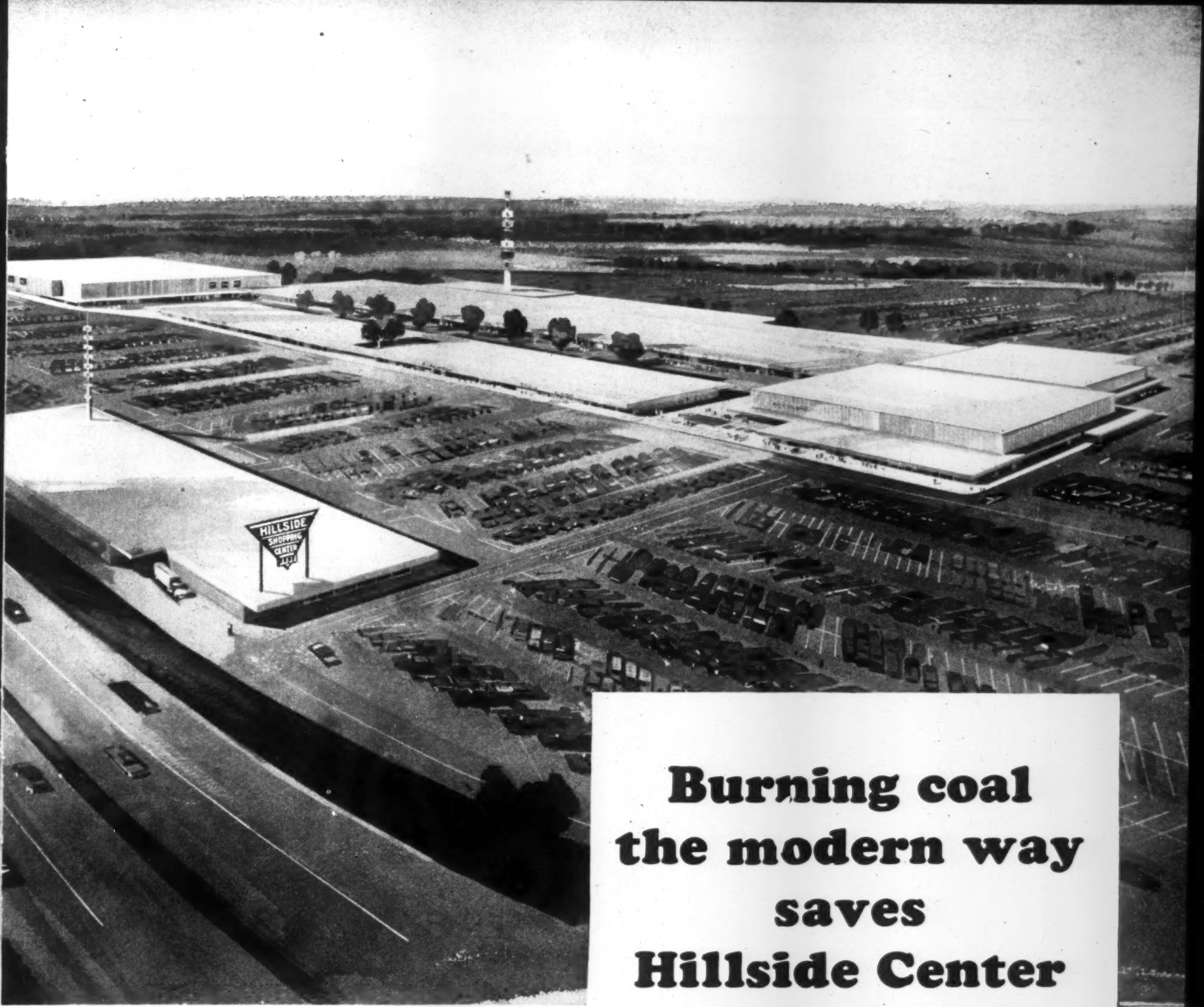
. . .engineered to dry both before, after filtering—*Imperial Brass Mfg. Co., Dept. HPAC, 1200 W. Harrison St., Chicago 7.*

Are said to give greater drying, filtering capacity in more compact units. Cited features are easy refilling, quick disassembly for cleaning. Charged with silica gel, units furnished with flare nuts, copper seal caps.

Scale, Corrosion Inhibitor . . .

. . .for use in steam boilers using zeolite softened makeup water—*Calgon, Inc., Dept. HPAC, 323 Fourth Ave., Pittsburgh 22.*

"Composition SW" formulated to correct scale, corrosion trouble when properly used in conjunction with soft makeup water.



Burning coal the modern way saves Hillside Center $26,000 a year

The new Hillside Center, Chicago, Ill., is one of the country's largest and most modern shopping centers. Situated on a 59-acre site, it contains over 70 stores and offers parking space for nearly 5,000 cars. When Hillside Center was planned, exhaustive studies were made of prospective fuels . . . and it was decided to burn coal the modern way. For one thing, the initial economy of the mechanical system indicated coal. The cost of a complete coal system—boilers, coal and ash handling equipment, controls, etc.—fell within budget limitations. And, in view of limited space, the compactness of the system was an additional inducement. Finally, boiler room labor costs are at a minimum and actual operation savings with coal, compared to other fuels, is estimated at $26,000 a year.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

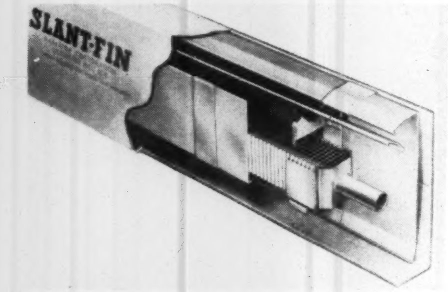
BITUMINOUS COAL INSTITUTE
Southern Building • Washington 5, D. C.

Consult an engineering firm

Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel cost and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar • Automatic coal and ash handling systems can cut your labor cost to a minimum • Coal is the safest fuel to store and use • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

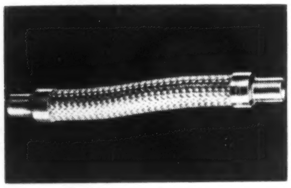


3/4 in. Baseboard Radiator . . .
. . . package designed to permit easy installation, provide high Btu output—*Slant-Fin Radiator Corp., Dept. HPAC, Richmond Hill, N.Y.*

Package includes heating element, snap-on cover assembly, support brackets, adjustable vane dampers, track expansion "clip" hangers, splice plate. Packages contain units in 4, 5, 6, 8 ft sizes.

Centrifugal Roof Ventilator . . .
. . . engineered for high performance rating, low noise level—*Peerless Electric Co., Dept. HPAC, Warren, Ohio.*

Recommended by company for schools, churches, auditoriums, hospitals, similar installations where low noise levels must be maintained. When powered with larger, heavier motor, unit serves commercial, industrial field as high efficiency unit, says company.



Noise Absorber . . .
. . . for use in air conditioning, refrigerating units—*Cobra Metal Hose, Dept. HPAC, 4640 W. 54th St., Chicago 32.*

Designed to eliminate noises that develop from solid pipe, simplify connecting pipelines, correct misalignments. Made of seamless bronze tubing, with bronze wire braid sleeve.

Condensate Removal Pump . . .
. . . for air conditioning equipment—*March Mfg. Co., Dept. HPAC, 8015 N. Lawndale Ave., Skokie, Ill.*

Uses 1/4 in. copper tubing from pump to drain instead of oversized pipe required for gravity drains. Cited features are compactness, new manifold air

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Air Conditioning
Serves Throughout
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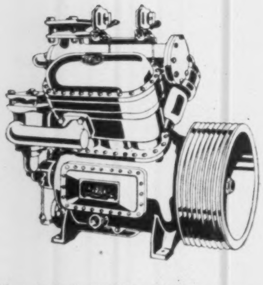
CLAYPOOL HOTEL



Nine Frick "ECLIPSE" Compressors Air-Condition the Claypool Hotel at Indianapolis

Famed as the first COMPLETELY air-conditioned large hotel north of the Mason-Dixon Line, the Claypool at Indianapolis selected Frick equipment because it had used Frick Refrigeration for food service since 1939.

Nine Frick "ECLIPSE" compressors, installed by Decker and Roberts of Fort Worth, carry the air conditioning load, which is divided into three systems.

You get the utmost in air conditioning, ice making, quick freezing and other cooling services when you specify "Frick." Let us quote now on your commercial or industrial cooling needs.

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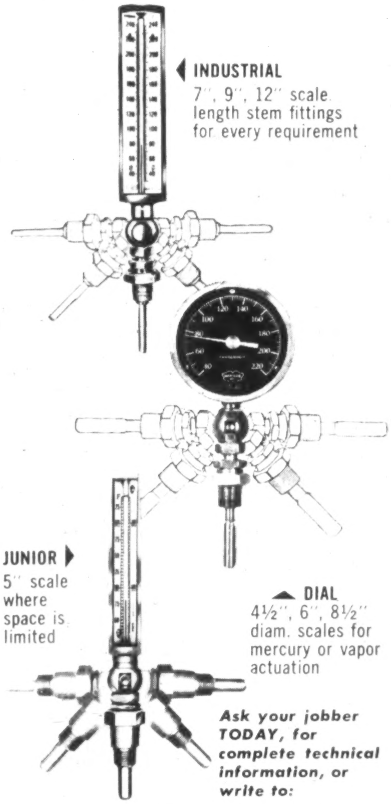
ADJUST-ANGLE THERMOMETERS
for any application
...for any industry!

Weksler ADJUST-ANGLE thermometers position to any angle through 180° arc, either before or after installation, by a simple locknut adjustment. Solves intricate installation problems with greater visibility at odd angles. Tested to withstand shock, vibration and strain, even under the most rugged conditions. Reduces installation and maintenance worries.



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5" scale where space is limited

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4½", 6", 8½" diam. scales for mercury or vapor actuation

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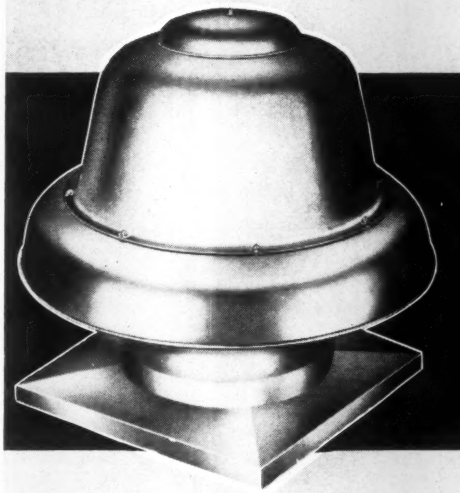

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Power Line will feature an extremely broad line of equipment *plus* specialized service to industry. . . . All sales will be made through highly trained ventilation engineers, fully qualified to design and layout complete plant systems. . . . Complete information on Power Line products and services will be gladly mailed on request.

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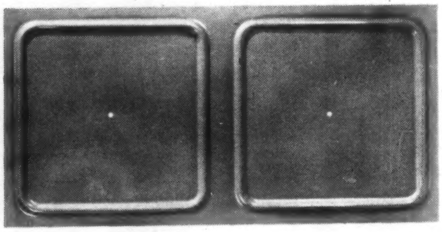
(Division of National-U.S. Radiator Corporation)

EQUIPMENT DEVELOPMENTS

Continued

bleeding system, ease of installation. In two models with 6 and 9 ft vertical lifts, 200 and 300 ft horizontal runs.



PVC Tank Liner . . .

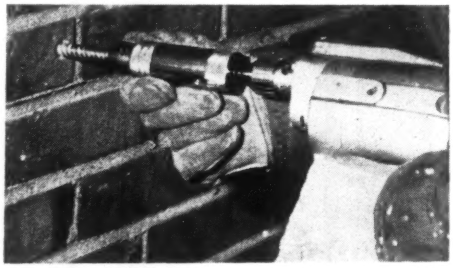
. . .with built-in thermal compensation—*H. N. Hartwell and Son, Inc., Industrial Plastics Div., Dept. HPAC, Park Square Bldg., Boston* 16.

Constructed of unplasticized polyvinyl chloride, expansion sheet is said to combine corrosion resistance of PVC with demand for larger size tanks and greater allowable temperature differentials. Absorbs expansion, contraction by movement of corrugations built into individual sheets. Each sheet measures 30 × 60 × 3/16 in.

Vacuum Controlled Check Valve . . .

. . .for use with compressors—*Miller Valve Co., Inc., Dept. HPAC,* 1620 *Pennsylvania Ave., Pittsburgh.*

Operates as follows: When reciprocating compressor cuts in, piston disc rises into chamber, causing air in cylinder to be expelled which causes suction or partial vacuum to be built-up and which holds piston disc in wide-open position when compressor is in operation. When compressor cuts out, weight of piston disc returns disc to closed position. In sizes 1½ to 10 in., 150 to 2500 lb.



Masonry Drill Attachment . . .

. . .designed for high speed drilling in concrete, brick, masonry—*Power Tools Corp., Dept. HPAC,* 1425 *Lakeside Ave., Cleveland* 14.

Rotary impact unit can be used with any ¼ in.

★

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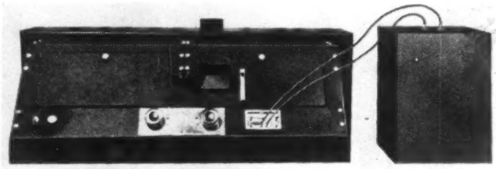
827 N. EUCLID AVE., PITTSBURGH 6, PA.

EQUIPMENT DEVELOPMENTS

Continued

electric drill, says company. Is said to facilitate drilling $\frac{1}{2}$ in. holes 3 in. deep in concrete within 30 sec. For use with standard carbide drill bits $\frac{1}{4}$ to $\frac{7}{8}$ in.



Gas Analyzer . . .

. . .designed for wide range, sensitivity, rapidity of analysis — *National Instrument Laboratories, Inc., Dept. HPAC*, 6108 *Rhode Island Ave., Riverdale, Md.*

Recommended by company for monitoring of gas mixtures by continuous or batch control, detection of minute amounts of harmful gases in pollution or personnel safety problems.

Evaporative Condenser, Cooling Tower

. . .combination—*Baltimore Aircoil Co., Inc., Dept. HPAC, Baltimore* 3.

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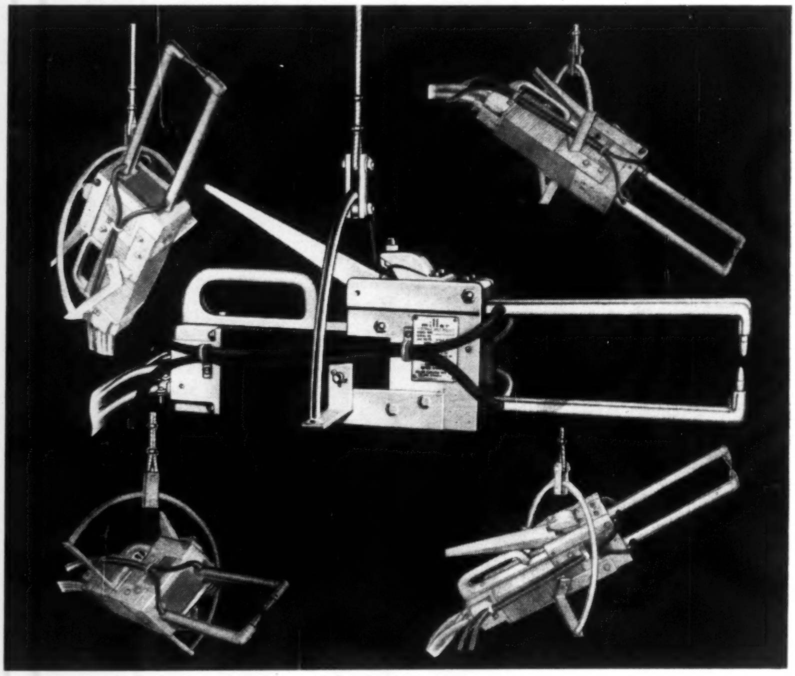
Water Cooled
Spot Welder

Manually or air operated, these welders are equipped with ball bearing suspension rings for fatigue-free operation. Water cooled transformer and tongs. 6" tongs grip work with pressure up to 600 pounds. Air models actuated by 4-way valve, electrically operated. Made for 50/60 cycle 220 volt use, Model 10-KVA weighs 79 lbs., welds material up to 3/16"; Model 20-KVA weighs 91 lbs., handles 1/4" combined thickness. Air operated models average 53 lbs. more. Available also in pedestal style.



miller ELECTRIC MANUFACTURING COMPANY, Inc. • Appleton, Wisconsin
Distributed in Canada by: Canadian Liquid Air Co., Ltd., Montreal, P. Q.

Behind the product *this modern plant incorporates the latest ideas in research, design and efficient manufacture.*

filtration

our one business since 1925

Make our own dust storms *to test dirt removing efficiencies of all kinds of filters in constant search for better performance.*

Because filtering gases and liquids is still an art rather than an absolute science, proven experience itself is even more important in this field than in other technical areas.

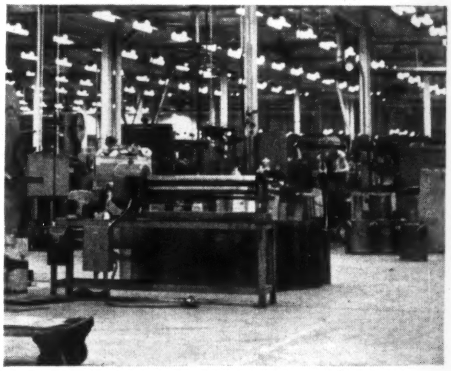
We at Air-Maze have specialized entirely in the art of filtration for over a quarter century. As a result, there are few filtering problems that we have not encountered during this time. Through first hand experience, we have learned that *what not to do* is a highly important factor in successfully engineering a filter for a particular job.

There is a saying in the filter business that, "In most cases one never knows he has the wrong filter until it's too late". Consequently, as a buyer or specifier of filters, our 31 years of proven experience, we believe, is invaluable to you.

The prime function of our application engineers is to guide you in selecting the right filter . . . even though it means suggesting an item we do not make, as is sometimes the case. By experience, we recognize that future business depends on your confidence in us. So we endeavor to justify your complete confidence in every recommendation that Air-Maze makes.

A fully staffed organization, backed by adequate plant facilities with a well-equipped testing laboratory, have helped Air-Maze become one of the largest filter manufacturers in the country.

That's why you can rely on the slogan, "Keep it clean with Air-Maze". The Air-Maze Corporation, Cleveland 28, Ohio.

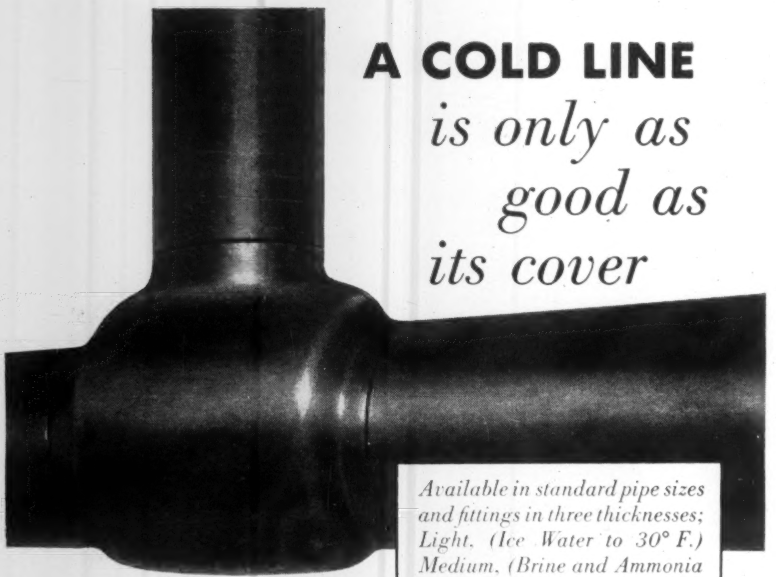


Quality manufacture *with latest type production equipment gives you peak value per dollar.*

AIR-MAZE
The Filter Engineers

AFI MEMBER AIR FILTER INSTITUTE

AIR FILTERS • SILENCERS • SPARK ARRESTERS • LIQUID FILTERS • OIL SEPARATORS • GREASE FILTERS



A COLD LINE
*is only as
good as
its cover*

*Available in standard pipe sizes and fittings in three thicknesses;
Light, (Ice Water to 30° F.)
Medium, (Brine and Ammonia to 0° F.)
Heavy, (Heavy Brine—25° F. and lower.)*

UNITED CORK PIPE COVERING
THE IDEAL COLD LINE INSULATOR

A cold line system is only as effective as its insulation. Inferior pipe covering in just one section of the line will cause operating costs to skyrocket and a considerable loss in dollars to the cold storage operator. United's pipe covering gives you the best insulation with all these advantages:

Extremely low "K" factor
Retains over 80% of cold loss on piping
Easy and economical to install
Long trouble-free life
Fire retardant—Vermin resistant
No capillarity

LARGER STOCKS—FASTER DELIVERY—PERSONAL SERVICE

United Pipe Coverings are available from stock for prompt delivery—to fulfill your immediate installation requirements. Mail the coupon below for additional information or the name of the United distributor nearest you.

Corkboard
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UNITED BB CORKBOARD

Manufacturers of cork insulation for almost a half century

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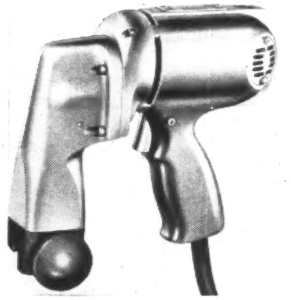
Engineering offices, or approved distributors, in key cities—coast to coast.

EQUIPMENT DEVELOPMENTS

Continued

In two types: Draw-through arrangement requires minimum floor space, is generally used for indoor installations. Two pan sections available, one for attaching ductwork to inlet, other for minimum height requirements. Blow-through arrangement is for outdoor installations, although can be used indoors when equipment room can be used as plenum.



Electric Tool . . .

. . . for heating, ventilating, air conditioning contractors—*Milwaukee Electric Tool Corp., Dept. HPAC, 5316 W. State St., Milwaukee 8.*

Pittsburgh lock hammer unit designed to turn over flange on ductwork wherever Pittsburgh lock is used. Is easy to use, cuts labor costs, says company. Handles 30 to 22 gage sheet metal. Powered by 115 volt, a-c/d-c motor.

RUN
SAFE
JOG

Pushbutton Switch . . .

. . .engineered to combine functions of single button station with advantages of two- or three-position selector switch in one unit—*Cutler-Hammer, Inc., Dept. HPAC, 315 N. 12th St., Milwaukee.*

Cited feature of "Roto-Push" is oil

A-F AIR-FACTORS INC

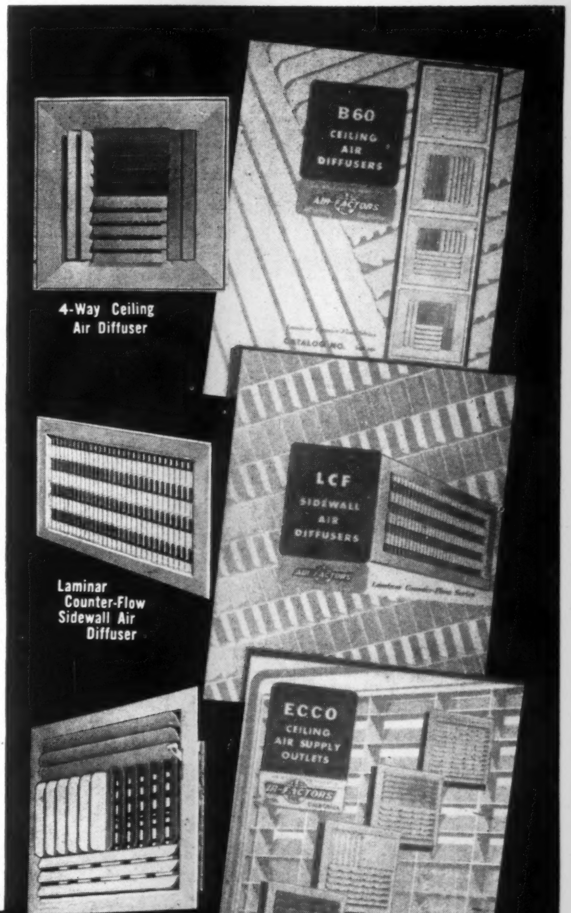
manufacturer of the only complete line of air distribution equipment

. . . There's a Story Behind Each Product

With these catalogs, Air-Factors, Inc., brings to the air conditioning, heating and ventilating industry a complete line of air distribution and air control equipment. Years of specialized on-the-job experience embracing every phase of air distribution and air control have gone into the individual design of each air supply outlet and return air exhaust inlet. Equal care and consideration have entered into the development of factory and laboratory facilities to give flexible production so that engineering and design will not be limited by inability to produce special sizes and type of equipment necessary to provide proper air distribution for our customers.

A select group of manufacturers' agents represent Air-Factors, Inc. All are qualified to assist in selecting your proper air distribution equipment.

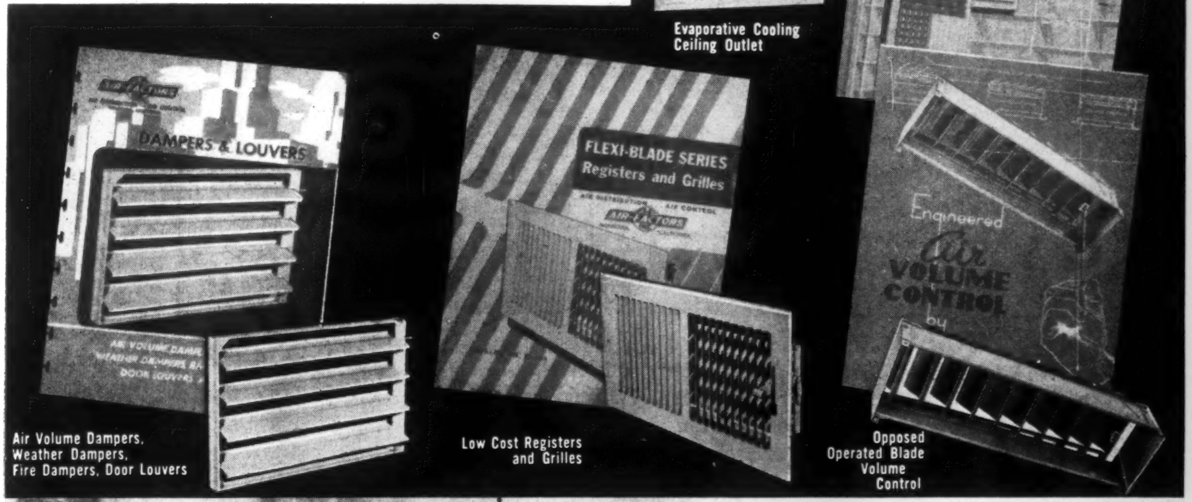
Write for Information


B60
CEILING AIR DIFFUSERS
AIR-FACTORS
LCF
SIDEWALL AIR DIFFUSERS
AIR-FACTORS
ECCO
CEILING AIR SUPPLY OUTLETS
AIR-FACTORS

4-Way Ceiling Air Diffuser

Laminar Counter-Flow Sidewall Air Diffuser

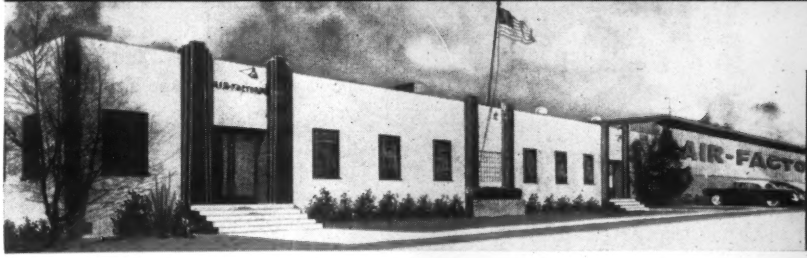
Evaporative Cooling Ceiling Outlet


AIR-FACTORS
DAMPERS & LOUVERS
FLEXI-BLADE SERIES
Registers and Grilles
AIR-FACTORS
Engineered
Air
VOLUME
CONTROL
by

Air Volume Dampers, Weather Dampers, Fire Dampers, Door Louvers

Low Cost Registers and Grilles

Opposed Operated Blade Volume Control



A-F AIR-FACTORS INC

1624 South Raymond Ave.
MONROVIA, CALIFORNIA

How to stop noise, vibration and "hammer" in water lines

THE ORIGINAL SOUNDZORBER expressly designed for use in air conditioning water lines . . .

SOUNDZORBER

A wire-reinforced wrapped fabric rubber pipe, SOUNDZORBER can be used continuously in water lines at up to 250 psi working pressure (safety factor: 5 to 1).

SOUNDZORBER

Smaller sizes ½" to 3" available with male I.P.T. bronze fittings. Larger sizes available with integral full-faced rubber flanges backed up with Series 15 or Series 30 steel flanges. No metal-to-metal contact.

SOUNDZORBER

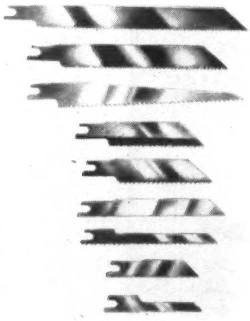
SOUNDZORBER is but one of a complete line of Finn vibration controls. Finn has control devices for every vibration problem in your field. Write for complete information.

FINN
INDUSTRIAL DIVISION

VIBRATION FINNFLEX CONTROL

T. R. FINN & COMPANY, INC.
200 Central Ave., Hawthorne, N. J.

tight design. Contacts maintained or momentarily operated by either turning guard ring, depressing button, or both.



Saw Blades . . .

. . . designed for rapid cutting of sheet metal, bar stock, etc.—*Independent Blade Co., Dept. HPAC, 587 Thompson Ave., East Haven 12, Conn.*

Made of flexible resistor, specially hardened steel. Due to hardness, blades will give longer cutting life, says company.

"Snap-On" Housing Cap . .

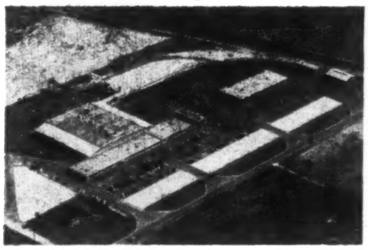
. . . for use with company's brick panel chimney housing—*Van Packer Co., Dept. HPAC, Bettendorf, Iowa.*

Design feature of cap cuts installation time to 30 sec, says company. Installed by pressing cap securely down onto cement-asbestos brick panel housing.

Equipment Briefs . . .

GAS VENT action demonstrator simulating flow of gases through vent pipes—*William Wallace Co., Metalbestos Div., Dept. HPAC, Belmont, Calif.* In demonstrator, water in glass pipes proportionate in size to standard gas vent pipes and connectors shows that when pipe size is correct, water flows evenly without overflow which represents spillage in an operating vent. When incorrect size is used, simulated installation does not function properly.

Specify RECO



Tampa Electric Co., Operations Center, Tampa, Fla.
Architect Engineers:
Stone & Webster Engineering Corp., Boston, Mass.
Reco Representative—W. B. Parson Co., Needham, Mass.

TECO Specifies RECO for hot water at new operations center

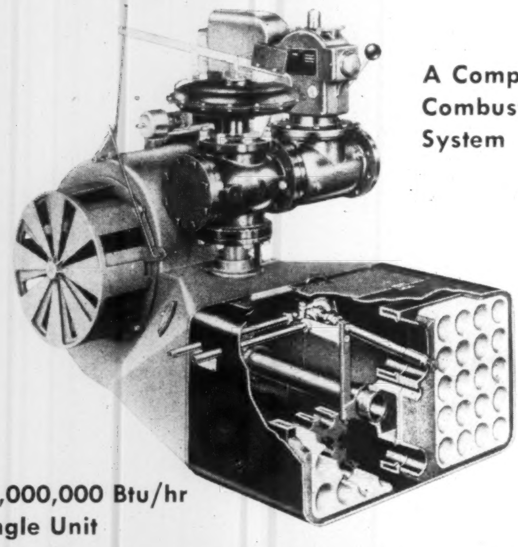
Tampa Electric Company's new Operations Center serves Florida's "Center of Activity." And in the center of this huge operations headquarters, a new RECO corrosion-resistant, copper-silicon storage heater serves 2300 gallons of piping hot water per hour. As always, RECO meets round-the-clock demands with minimum maintenance.

Put top quality and performance, fair price and quick delivery into *your* specifications—SPECIFY RECO.

Write today for free catalogs plus name of RECO representative nearest you to: Dept. N, Richmond Engineering Co., Inc., 7th & Hospital Sts., Richmond 5, Virginia

RICHMOND ENGINEERING CO., INC.

PACKAGED POWER "FAN-AIR" BURNERS



- Completely packaged . . . nothing else to buy or install
- Tested and adjusted for jobsite conditions prior to shipment
- Smooth, noiseless combustion with minimum excess air
- Wide turndown range with no danger of flashback
- More uniform and effective heat distribution
- Natural draft operation during power failures
- Least expensive installation
- Requires less stack and furnace draft
- Built to exceed standards of all approval agencies
- Complete burner shutdown following flame failure
- Mettler patented spark-ignited rectifier safety pilot, with dependable electronic flame safety relay
- Available with steam, pressure, or air atomizer for burning heavy oils in combination-type unit

Write for new Catalog and Specifications
Bulletin G-200-B describes exclusive "Fan-Air" features, accessories, pilot operation, and major specifications of burners ranging from 400,000 to 25,000,000 Btu input. Write for copies, today!

THE METTLER CO., INC.
Division of ECLIPSE FUEL ENGINEERING CO.
4366 Worth Street, Los Angeles 63, California

EQUIPMENT DEVELOPMENTS

Continued

EXPANSION SHELLS in seven standard bolt sizes 1/4 to 7/8 in.—*J. D. Polis Mfg. Co., Dept. HPAC, 2900 W. 26th St., Chicago 23.* Units are combination masonry drill and concrete anchors that can be installed with air or electric hammer. Recommended by company for anchoring work in concrete and masonry construction, for heating and air conditioning duct installation, other uses.

NAMEPLATE PRESS for stamping individual letters, numbers on identification plates, tags—*Clearview Co., Dept. HPAC, 172 Stanton St., New York 2.* Recommended by company for stamping special code numbers, other information on plates attached to equipment, machinery.

SOLDER formulated to be hard and strong, resistant to corrosion—*Alpha Metals, Inc., Dept. HPAC, 56 Water St., Jersey City.* Made of indium, in combination with tin, lead, silver. Especially resistant to lye, other alkalies, says company, has increased wetting power.

BURNISHER with plastic "slimgrip" handle—*Adre Co., Dept. HPAC, 8980 W. Hawthorne Ln., Hales Corners, Wis.* New 3 in. unit designed for use where relay contacts are almost completely hidden and hard to reach. Is accessory for company's pen-type contact burnisher.

LIGHTNING ARRESTERS for protecting submersible pump components during electrical storms—*Deming Co., Dept. HPAC, Salem, Ohio.* Designed to provide safe grounding of high voltage surges in power lines leading to motor, controls, cable. Installed in control box or magnetic starter. Available for single phase, 115 or 230 volt, and three phase, 220 or 440 volt motors. Wiring diagrams showing proper installation provided. #

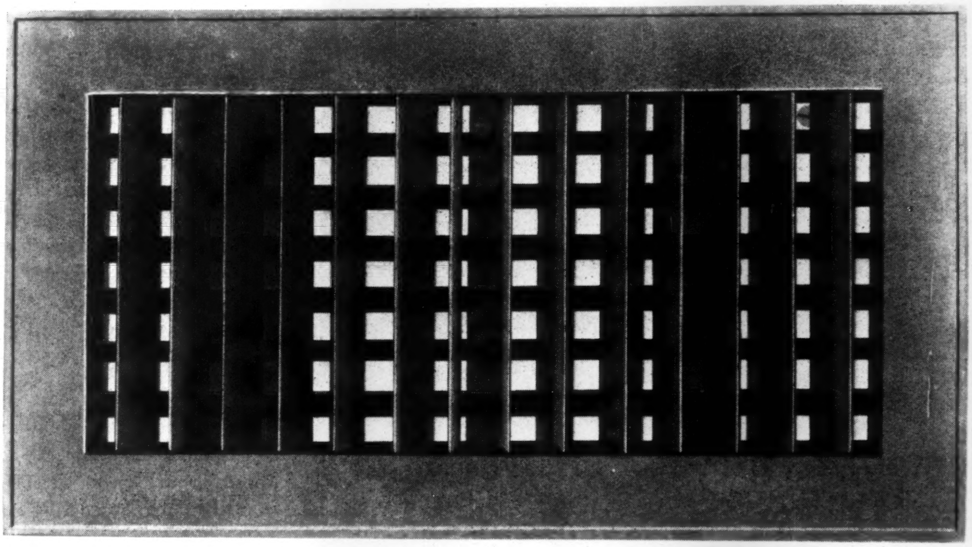
Lowest SOUND RATINGS

on AIR-CONDITIONING SYSTEMS

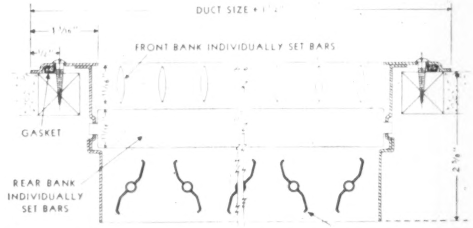
with NO. 190 U.S. MULTI-FLEX and NO. 200 NON-FLEX

AIR CONDITIONING REGISTERS and GRILLES

A "GIANT" in AIR DISTRIBUTION and MOVEMENT
A BEAUTY in APPEARANCE and Unequalled Design



Showing Horizontal Cross-Section of the No. 190 U. S. MULTI-FLEX REGISTER


DUCT SIZE + 1 1/2"
1 5/16"
1/2"
FRONT BANK INDIVIDUALLY SET BARS
GASKET
REAR BANK INDIVIDUALLY SET BARS
2 5/8"

SCREWDRIVER OPERATED OPPOSED VALVES

No. 190 Series (Opposed Valves — Screw-Driver Operation — No Keys to Lose) is the Smoothest, MOST POSITIVE OPERATION of all Air Conditioning Lines. The DOUBLE-EDGED STREAMLINED Grille Bars Minimize Resistances, Reduce Sounds of Air Movement at All Velocities, and Will Balance the System to the Finest Degree and Direct the Air Distribution to every Required Location.

Definitely a STYLE for Every Condition may be furnished.

WRITE for LATEST COMPLETE CATALOG, COVERING COMPLETE LISTS of STYLES and Specification Data

UNITED STATES REGISTER COMPANY

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY

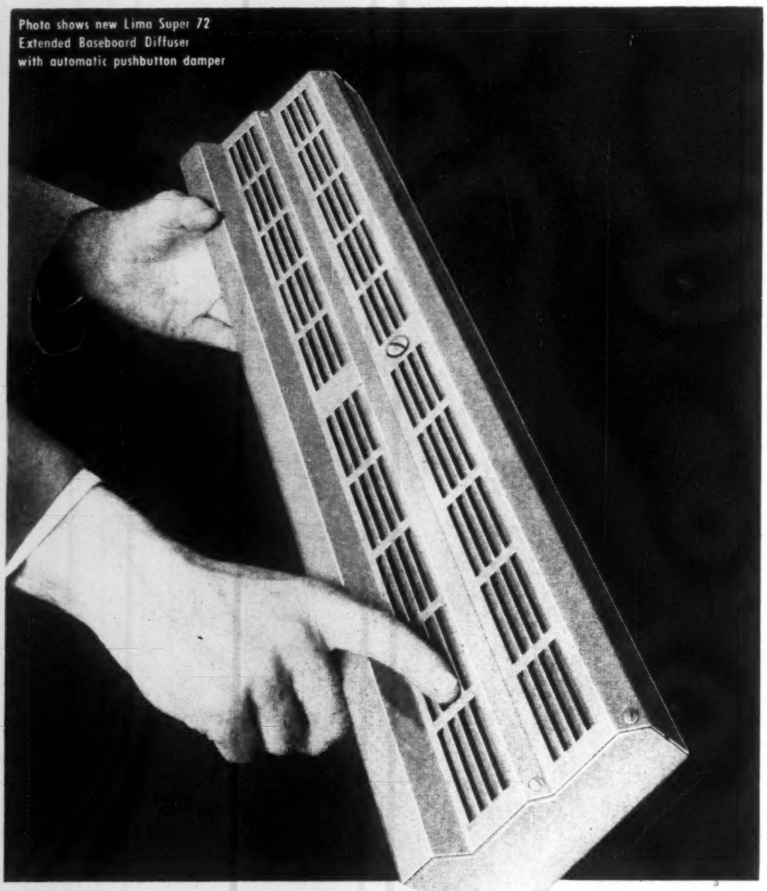


Photo shows new Lima Super 72
Extended Baseboard Diffuser
with automatic pushbutton damper

YOUR CLIENTS CAN SEE

Lima Built-in Quality

The diffuser you specify is the showpiece of the heating and cooling system—installed where it is seen every day.

There's no question about the permanent beauty . . . heavy gauge metal . . . and quality construction of Lima diffusers. Your clients can see these built-in extras that cost no more.

And there's no question about the outstanding performance. Lima diffusers have built-in design features for proper throw and spread in heating and cooling. The extra quality construction eliminates rattling or whistling at higher air velocities.

For details on the complete Lima line of quality diffusers, registers and grilles, see Sweet's Architectural File 29f/Li or write for latest catalog.

Lima REGISTER COMPANY • LIMA, OHIO

sold exclusively through heating wholesalers and manufacturers

RECENT TRADE LITERATURE . . .

▶ *ADSORPTION*—How an activated carbon impregnated with an inorganic desiccating agent develops high capacity for adsorption of water explained in new bulletin. Literature describes various uses for "Adsorbite D-8," formulated to be highly effective dehydrating agent. *Barnebey-Cheyney Co., Dept. HPAC, Cassady at E. Eighth Ave., Columbus 19, Ohio.*

▶ *AIR BLENDER SYSTEM*—Two booklets describe new heating, ventilating air blender system designed for schoolroom application. Literature explains how system works from central supply source, how individual room control of heating, ventilation, ventilation-cooling is provided. *Westinghouse Electric Corp., Sturtevant Div., Dept. HPAC, 200 Readville St., Hyde Park, Boston 36.*

▶ *AIR CONDITIONERS*—Bulletin No. 133 describes coil surface type air conditioners for industrial, commercial applications. Machines offered in capacities 41,500 to 1,680,000 Btu per hr cooling range. *Niagara Blower Co., Dept. HPAC, 405 Lexington Ave., New York 17.*

▶ *AIR RELEASE VALVES*—Bulletin 856 covers air release valves for: venting air from hot water heating systems; venting air from chilled water cooling and air conditioning systems; to replace air from industrial, municipal pipelines, other equipment such as tanks, brine lines, etc. *V. D. Anderson Co., Dept. HPAC, 1935 W. 96th St., Cleveland 2.*

▶ *ALUMINIZED STEEL*—Properties, characteristics of aluminized steel "Type 1" described in folder P.O. 3056. Product is reported to have resistance to combinations of heat and corrosion; high heat reflectivity; surface qualities of alu-

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Are you interested in securing additional lines?

We are occasionally asked by our manufacturer advertisers to suggest the names of manufacturers' agents in various sections of the country whom they can contact in regard to representation of their industrial and large building heating, piping, and air conditioning products.

If you would like your name listed on our records for inquiries we may receive on your territory, we invite you to write us. There is no charge in connection with this service.

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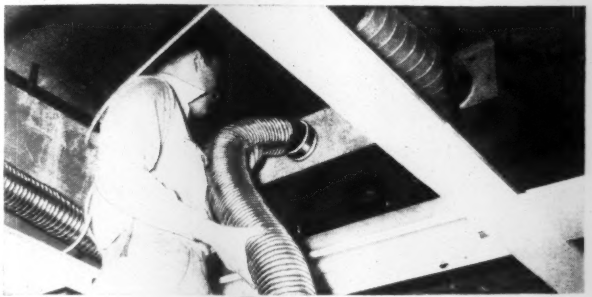
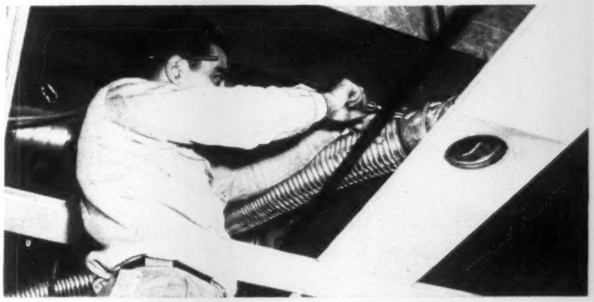
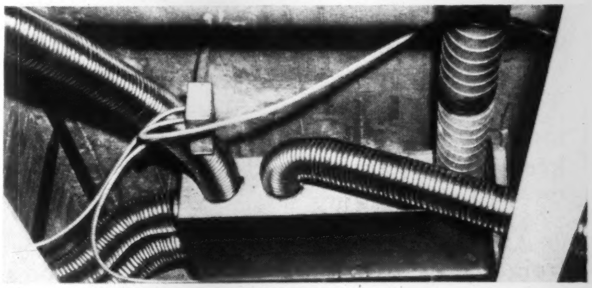


OVER 8 MILES of WIREMOLD *flexible* AIR DUCT installed in the *NEW* SOCONY-MOBIL BUILDING!





Hours of installation time *SAVED* with Wiremold Air Duct

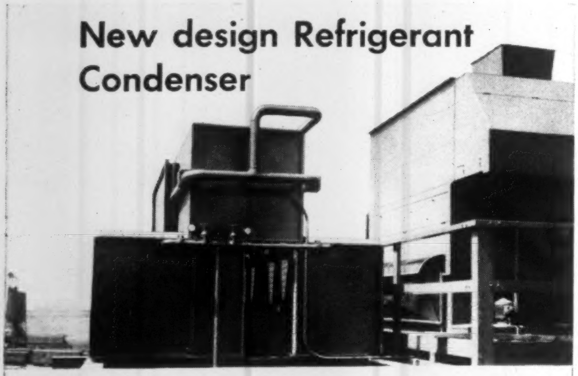
It is estimated that over 8 miles (46,440 lineal ft.) of Wiremold flexible Air Duct was used in the air conditioning installation at the Socony-Mobil Office Building.

The modular ceiling idea permits easy and fast relocation of partitions, lighting fixtures and air diffusers. Wiremold flexible Air Duct made the flexibility in air distribution possible. Thus the Socony-Mobil Building can handle frequent tenant changes without expensive renovation costs.

GET THE WHOLE WIREMOLD STORY AT
Booth 213,
13TH INTERNATIONAL HEATING &
AIR CONDITIONING EXPOSITION.

THE WIREMOLD COMPANY
HARTFORD 10, CONNECTICUT

New design Refrigerant Condenser



...gives far more efficiency and better, trouble-free service

7

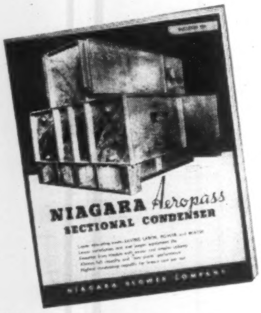
With this new, sectional design Niagara condenser you avoid the many troubles due to faulty condensing and get at all times the full capacity your refrigerating plant should afford.

You benefit from extra saving in upkeep labor and expense. The casing of this new condenser is made of sections each separately removable, giving you access to all parts for easy inspection to head off dirt and corrosion, to clean the coils easily from either side.

You benefit from greater efficiency in condensing. A simpler method of using evaporative cooling improves heat transfer. You benefit from Niagara features that remove super-heat before condensing and keep the system purged of oil. You save 95% of the cooling water cost.

You benefit from a low first cost, lower freight cost and less expense in erection.

Capacity range is from 60 to 240 tons. Write for Niagara Bulletin 131. Find out how your plant can save expense this season.



NIAGARA BLOWER COMPANY

Dept. HP, 405 Lexington Avenue
NEW YORK 17, N. Y.

District Engineers in Principal Cities

NIAGARA *Over 40 Years' Service in Industrial Air Engineering*

RECENT TRADE LITERATURE

Continued

minum with strength of steel. *Armco Steel Corp., Dept. HPAC, 3056 Curtis St., Middletown, Ohio.*

▶ *AMMONIA UNIT*—Ammonia unit, with hot gas defrost pan, for use in hot gas defrost systems described in catalog No. 13C6a. Included is graphic illustration of product, along with dimensions and specifications for ammonia direct expansion with defrost pan and ammonia flooded with defrost pan. *Recold Corp., Dept. HPAC, 7250 E. Slauson Ave., Los Angeles.*

▶ *BYPASS ROTAMETER*—Bypass rotameter, designed to permit economical measurement of large fluid flow rates in pipe sizes 2 in. and more, described in bulletin 116. Unit utilizes inherent advantages of rotameter such as: linear response, wide range, direct reading scale, ability to handle corrosive fluids, says company. *Brooks Rotameter Co., Dept. HPAC, Lansdale, Pa.*

▶ *CENTRIFUGAL FANS*—New 60 page bulletin C-103 lists company's latest line of backward curved blade centrifugal fans. Performance charts included. Units designed for range of commercial and industrial ventilating, air conditioning, heating applications. *Chicago Blower Corp., Dept. HPAC, 9863 Pacific Ave., Franklin Park, Ill.*

▶ *CENTRIFUGAL FANS*—Centrifugal fans designed to be quiet operating, large capacity, slow speed units presented in 10 page bulletin. Performance charts on various fan types given. Units are suitable for belt or direct drive, meet requirements of wide variety of applications, says company. *Chicago Blower Corp., Dept. HPAC, 9863 Pacific Ave., Franklin Park, Ill.*

▶ *CENTRIFUGAL ROOF VENTILATOR*—Bulletin SDA-220 discusses integral parts of centrifugal roof ventilator. Several pages devoted to ratings, performance data. *Peerless Electric Co., Fan and Blower Div., Dept. HPAC, Warren, Ohio.*

▶ *COMPRESSORS*—Small, air cooled compressors for industrial, commercial, general uses described in 16 page bulletin AC-15. One-, two-stage units offered, with working pressures 85 to 175 psi. *Gardner-Denver Co., Dept. HPAC, Quincy, Ill.*

▶ *CONDUIT SYSTEM*—Technical data on "Insul-Fil" conduit system contained in 18 page brochure. Gives descriptions, instructions for installing. Contains illustrations, specification tables. *Insul-Fil Co.,*

RECENT TRADE LITERATURE

Continued

Inc., Div. of Miracle Adhesives Corp., Dept. HPAC, 214 E. 53rd St., New York 22.

▶ *CONTROLS*—Bulletin 005 is revised edition of earlier catalog and lists all of company's equipment for measurement, control of liquids, gases. Illustrated are types of controllers, gages, manometers, recorders, meters, valves, Venturi tubes, etc. *Simplex Valve & Meter Co., Dept. HPAC, 7 E. Orange St., Lancaster, Pa.*

▶ *DUST CONTROL*—*Dust Control for Industry* is title of new 16 page bulletin for plant engineers, managers, maintenance engineers in process industries. Encompassing range of dust control equipment and accessories, literature describes importance of dust control to industry. Lists primary component parts of dust control system. *Pangborn Corp., Dept. HPAC, Hagerstown, Md.*

▶ *DUST CONTROL*—Bulletin 551-D discusses use of local exhaust ventilation and cloth-tube-type dust collectors in combatting dust from coal and coke handling operations. Four illustrated case histories presented. *Wheelabrator Corp., Dept. HPAC, Mishawaka, Ind.*

▶ *ELAPSED TIME INDICATORS*—Two page bulletin ET 600 describes company's complete line of basic elapsed time indicators. "7500" series d-c units employ standard or chronometrically governed d-c motors, while "12500" series a-c units use synchronous 50 or 60 cycle motors and "24200" series use synchronous 400 cycle motors. *A. W. Haydon Co., Dept. HPAC, Waterbury, Conn.*

▶ *FLUID DRIVES*—"Type VS" class 2 "Gyrol" fluid drives in 7½ to 800 hp range detailed in 8 page bulletin A-119. Advantages, applications of adjustable speed units discussed. Selection tables included. *American Blower Corp., Dept. HPAC, Detroit 32.*

▶ *FLUXES*—Application, advantages of company's mild acid flux, nonactivated rosin flux, activated rosin flux described in 2 page bulletin. Information designed to be of interest to those involved in problems of electronic, electrical, dip and printed circuit soldering. *Accurate Specialties Co., Inc., Dept. HPAC, 9-01 43rd Ave., Long Island City, N.Y.*

▶ *FUEL BURNING SYSTEMS*—New 6 page bulletin No. 1231-A details fuel burning systems designed as packaged combustion assembly utilizing gas, oil or combination gas/oil firing. For modernizing or con-

NEW Weather Reset time switch makes all heating control systems

FULLY AUTOMATIC

Outguesses the weather!

The time of shift from night to day thermostat changes automatically with every degree change in outdoor temperature

THE WEATHER-CHRON

You can have the best room thermostat, use zone or individual room controls, or even outdoor-type heat controls, BUT—unless you use a "Weather Reset" time switch to automatically change the time of starting heat flow in the morning, you will *NOT* have automatic temperature control.

The WEATHER-CHRON is the automatic time switch that takes all guess-work out of "setting the time switch." It is *MORE* than just a time switch, and yet is installed and connected into any thermostat circuit exactly as is any ordinary time switch in any heating or air conditioning control circuit. It has a temperature-sensitive bulb like that of an indoor-outdoor thermometer that is placed outdoors where it constantly measures outdoor temperatures. Instead of just showing what the outdoor temperature is, it:—

Changes the time heating starts as outside temperatures change.

Permits the thermostat (all types) to control heat flow during the day.

Stops heat flow as outdoor temperatures rise above 65°F.

Shuts down heating earlier in mild weather—later in cold weather.

Turns heat back on at night when outdoor temperature drops below selected low levels.

One-day and seven-day models are available as is a double switch model for use with outdoor-type controls that provides a high temperature morning build-up period before switching to the outdoor controller. All-electric or electric with 30-hour spring carry-over clock action is available.

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☐ Outdoor-type space heating controls.

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City________
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RECENT TRADE LITERATURE

Continued

verting existing boiler equipment, or for obtaining efficient operation from new equipment. Literature contains photographs of various elements of systems. *Orr & Sembower, Inc., Dept. HPAC, Reading, Pa.*

▶ *FUEL OIL PUMP, HEATER SETS*—Means for proper preparation of heavy oil for combustion discussed, packaged fuel oil pump and heater sets illustrated and described in new catalog. Single and duplex units heat to 300 F, pump to 400 psi, have capacities to 3000 gph. *Walter H. Eagan Co., Inc., Dept. HPAC, 2336 Fairmount Ave., Philadelphia* 30.

▶ *GAS FIRED SALAMANDER*—New 4 page bulletin discusses "Radi-Heator" gas fired salamander said to be adaptable for localized heating in old, high ceiling industrial plants and in steel, foundry, fabrication, chemical, other industries. *Summit Products Co., Dept. HPAC, Uniontown, Pa.*

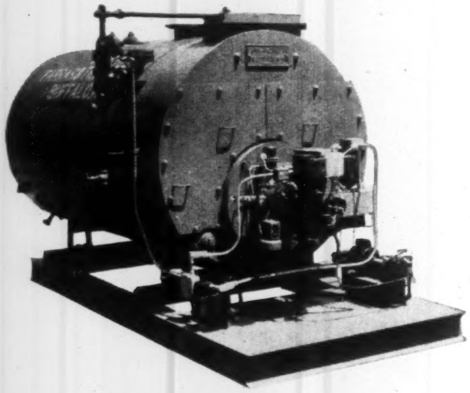
▶ *GAS FIRED UNIT HEATERS*—Two 4 page bulletins cover applications of company's gas fired unit heaters. Units available with ratings 50,000 to 200,000 Btu per hr input. One bulletin contains zone map of United States showing minimum design temperature factors. *Peerless Mfg. Corp., Dept. HPAC, 14th and Ormsby Sts., Louisville* 10.

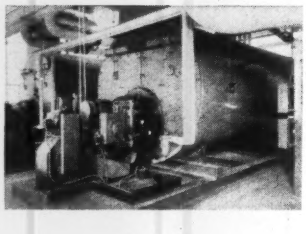
▶ *GAS VENT TABLES*—New 16 page booklet is guide containing tested gas vent installation data, with diagrams, sketches, tables. Eight tables cover company's double wall gas vent pipe sizes 3 to 12 in. ID. *William Wallace Co., Metalbestos Div., Dept. HPAC, Belmont, Calif.*

▶ *HAMMER DRIVE ANCHORS*—Pocket sized brochure illustrates new nail anchor application methods. Includes technical data with proposed Federal specification on safe working loads. Lists complete line of company's anchors. *Brush Nail Expansion Bolt Co., Dept. HPAC, Greenwich, Conn.*

▶ *HERMETIC CENTRIFUGAL REFRIGERATING MACHINES*—Catalog 19C-100 details hermetic centrifugal refrigerating machines in 90 to 350 ton models. Cutaway illustrations show features of units. Descriptions, selection and specification tables included. *Carrier Corp., Dept. HPAC, Syracuse, N.Y.*

▶ *HERMETIC COMPRESSORS*—Field serviceable hermetic compressors for use in packaged chillers, packaged air conditioners, commercial refrigeration units described in bulletin C-1100-B93 P. Units available in 2 to 7½ hp sizes. Literature contains information about features, component parts, specifications, dimensions. *Worthington Corp., Dept. HPAC, Harrison, N.J.*





Two BISON Super Scot Low-Pressure Boilers at Sylvania Electric Products, Inc., Batavia, N. Y. Engineers and General Contractors, Siegfried Construction Co., Inc., Buffalo, N. Y.; Heating Contractors, Joseph Davis, Inc., Buffalo, N. Y.

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RECENT TRADE LITERATURE

Continued

▶ *HUMID AIR COIL UNITS*—Catalog No. 3C6a describes humid air coil units for applications above 34 F. Dimensions and specifications listed for fluorinated hydrocarbon refrigerants, direct expansion ammonia, flooded ammonia, brine applications. *Recold Corp., Dept. HPAC, 7250 E. Slauson Ave., Los Angeles.*

▶ *HYDRAULIC POWER*—1957 catalog contains 60 pages listing equipment for factory, machine shop use. Includes illustrated pages on application, installation of hydraulic power. Shown are generators, hydraulics, motors, pumps, valves, transformers, cylinders, other equipment. *Groban Supply Co., Dept. HPAC,* 1139 *S. Wabash Ave., Chicago.*

▶ *INDUCED DRAFT FAN*—Induced draft "Bifurcator" fan detailed in bulletin DB-14-56. Gives manufacturers organizations boiler code ratings reduced to their common relationship of Btu per hr delivered to steam. Included are tables, charts on volume of flue gas for oil, gas, coal. *DeBothezat Fans Div., American Machine and Metals, Inc., Dept. HPAC, East Moline, Ill.*

▶ *INSULATION*—"Thermasil" pipe, block insulation for temperatures to 1200 F for power and process industries described in 6 page folder. *Ehret Magnesia Mfg. Co., Dept. HPAC, Valley Forge, Pa.*

▶ *INSULATION*—New 20 page booklet entitled *Specifications for Low Temperature Space Installations* contains information on recommended methods for installing "Foamglas" cellular glass insulation on walls, doors, ceilings, roofs of refrigerated spaces operating between −50 and 50 F. *Pittsburgh Corning Corp., Dept. HPAC,* 1 *Gateway Center, Pittsburgh* 22.

▶ *METAL SAWING*—Proper selection, use of hand and power hack saw blades, band saw blades covered in 36 page bulletin. Charts aid in selection of correct blade for particular job. Recommended cutting speeds, feeds, techniques tabulated. *W. O. Barnes Co., Inc., Dept. HPAC,* 1297 *Terminal Ave., Detroit* 14.

▶ *MOTOR SELECTION*—New 12 page bulletin B-2103-1 gives information on how to select a-c motors for specific applications. Included are such selection data as speed-frequency relationship, NEMA design classes, torque characteristics, current and torque values, frame selection tables, dimension charts, mechanical modifications for frame sizes 182 to 6085.

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CONDENSATION AND VACUUM PUMPS
HEATING SPECIALTIES
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RECENT TRADE LITERATURE

Continued

Reliance Electric and Engineering Co., Dept. HPAC, 1088 *Ivanhoe Rd., Cleveland* 10.

▶ *NOMOGRAM*—Nomogram for finding outlet area for downward jet of heated air available. Designed as simple method for determining size of grilles, round openings necessary to project heated air of given temperature to floor. *Barber-Colman Co., Dept. HPAC, Rockford, Ill.*

▶ *NUCLEAR REACTORS*—Bulletins N-56-8 and N-56-9 describe aqueous homogenous burner reactor and tank type research reactor, respectively. Former details operation of aqueous homogenous power plant, its auxiliary system, biological shield and containment, and includes cross-section and flow diagram. Latter covers operation and range of service facilities of tank type unit. *Foster Wheeler Corp., Dept. HPAC,* 165 *Broadway, New York* 6.

▶ *OIL BURNER*—Low pressure air atomizing burner designed to burn No. 6 oil described in bulletin AD-158. Unit rated at 90 gph. Literature cites advantages of burning this low cost fuel, says company. *Cleaver-Brooks Co., Dept. HPAC,* 326 *E. Keefe Ave., Milwaukee* 12.

▶ *PACKAGED FIREBOX BOILER*—Specifications for line of packaged firebox boiler-burner units engineered for four-pass fire travel, automatic operation with oil or gas or oil/gas combinations presented in bulletin ID-56-215. Units available in 17 ratings 35 to 485 hp. *York-Shipley, Inc., Dept. HPAC, York, Pa.*

▶ *PANEL METERS*—New 6 page bulletin 2057 contains descriptions, specifications, prices of over 800 models of panel meters in company's stock. Photographs show meter styles and various types of meter movements available. Dimensional drawings illustrate meter mounting. *Simpson Electric Co., Dept. HPAC,* 5200 *W. Kinzie St., Chicago* 44.

▶ *pH METER*—Circular No. 195 covers pH meter "Model 85." Includes description, features, price information. Unit is designed to be simple in operation and maintenance; fast, rugged and dependable in service. *Photovolt Corp., Dept. HPAC,* 95 *Madison Ave., New York* 16.

▶ *PIPE HANGERS*—Literature contains illustrations, descriptions of new model pipe hangers in company's line. Covered are "Latch Lock Figure 199" unit. "Clip-On" clevis type hanger. *Fee & Mason Mfg. Co., Inc., Dept. HPAC, Manasquan, N.J.*

▶ *PORTABLE POTENTIOMETER INDICATOR*—"MiniMite" portable pyrometer indicator, potentiometer type, described in bulletin No. 61. Literature contains information on specifications, calibrations and 15 standard, double range scales available with unit. *Thermo Electric Co., Inc., Dept. HPAC, Saddle Brook, N.J.*

▶ *PRESSURE GAGE*—New 4 page bulletin 403 includes description, illustrations, specifications, standard ranges for solid front "Bandrive" pressure gages. Units designed to have no gears, no hairspring, no backlash. *Norden-Ketay Corp., Dept. HPAC, Milford, Conn.*

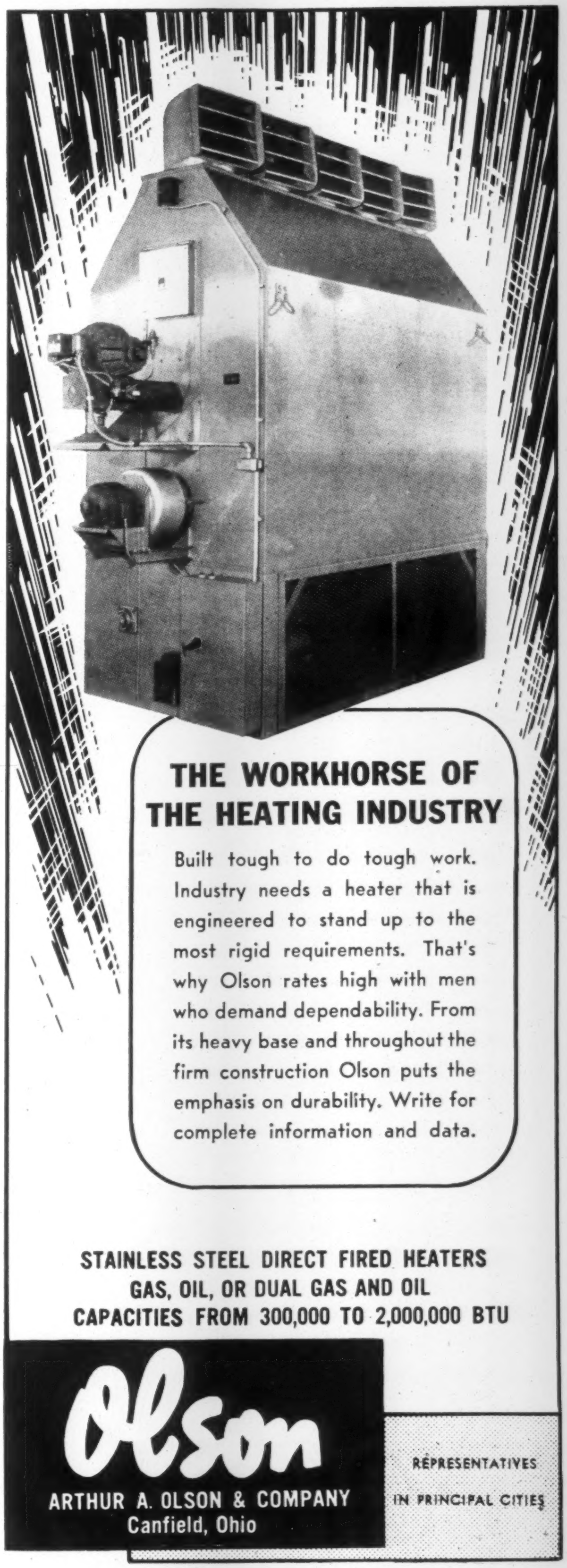
▶ *PROCESS INSTRUMENTATION*—New 32 page catalog No. 2 covers indicating, recording, controlling, transmitting instruments for flow, pressure, density. Items described are available for "immediate shipment," says company. *Fischer & Porter Co., Dept. HPAC, 907 Jacksonville Rd., Hatboro, Pa.*

▶ *PUMPS, WATER SYSTEMS*—Two new packaged water systems for shallow and deep well applications described in company's guide to pump and water systems. Includes information on selecting a water system, descriptions of other pumps for shallow, deep well or dual service and pumps for special applications. *Goulds Pumps, Inc., Dept. HPAC, Seneca Falls, N.Y.*

▶ *RECIPROCATING COMPRESSORS*—Included in bulletin DS-361 are ratings, data on 125 and 150 hp compressor and condensing units. Ratings of 60, 75, 100 ton condensers have been revised to conform with new, more efficient condenser, says company, which incorporates water heads at both ends. *Trane Co., Dept. HPAC, LaCrosse, Wis.*

▶ *RECIPROCATING PUMPS*—New 44 page catalog features air powered "Powerflo" reciprocating pumps and equipment for paint circulating systems, viscous material transfer, extrusion applications, spraying. *Gray Co., Inc., Dept. HPAC, 1015 Sibley St., N.E., Minneapolis* 13.

▶ *REFRIGERATION PRODUCTS*—Condensed general catalog No. R-400 details company's complete line of refrigeration products. Featured are air cooled condensers for jobs of 240 tons and higher. Selection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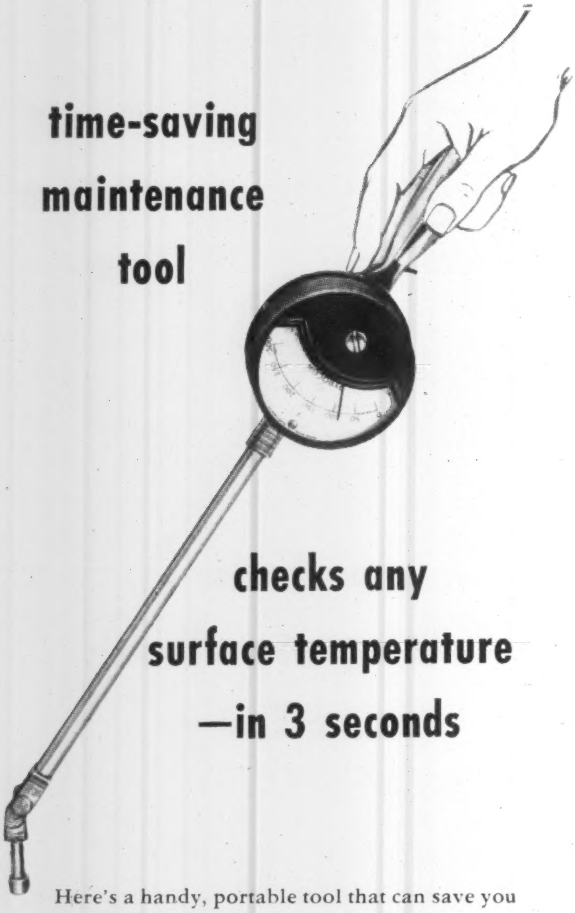

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tables included. *Kramer Trenton Co., Dept. HPAC, Trenton 5, N.J.*

▶ *REGULATORS*—New 4 page bulletin C-655 describes self operated regulators used in variety of industrial applications where it is desired to control pressures of water, steam, oil, gas, other fluids. Units are also used as air operated shutoff valves, which are actuated by pneumatic switches, solenoid valves, pilot valves or remote panel loaders. *Fisher Governor Co., Dept. HPAC, Marshalltown, Iowa.*

▶ *ROOM AIR CONDITIONERS*—Wallet sized folder illustrates full line of room air conditioners. Also has trade-in calculator. Each illustration accompanied by sizes, model numbers, specifications for each unit in series. *Mitchell Mfg. Co., Div. of Cory Corp., Dept. HPAC, 3200 W. Peterson Ave., Chicago.*

▶ *ROTATING VACUUM TRANSMITTER*—Catalog 70-27 describes rotating vacuum transmitter for automatic chlorine proportioning. Transmitter is used with rotating type flowmeter and chlorinator. Transmitted signal regulates chlorine feed in direct proportion to main line flow. *Fischer & Porter Co., Dept. HPAC, 906 Jacksonville Rd., Hatboro, Pa.*

▶ *SOLDERING IRON*—How to solder aluminum, other light metals ultrasonically described in bulletin SOL-109. Literature points out how soldering by means of ultrasonic soldering irons, tinning baths produces strong, noncorrosive bonds. *Acoustica Associates, Inc., Dept. HPAC, Glenwood Landing, Long Island, N.Y.*

▶ *SOLENOID PILOTS*—Form 1010 describes solenoid pilots designed for lower cost on-off control. Cutaway illustration, features, specification tables presented. Includes drawings of typical applications. *Spence Engineering Co., Inc., Dept. HPAC, Walden, N.Y.*

▶ *STAINLESS CASTINGS*—Corrosion and heat resisting stainless steel castings detailed in 28 page booklet. Technical data section gives information on physical properties, chemical composition-standard analysis on stainless steels used in casting. *Allegheny Ludlum Steel Corp., Dept. HPAC, 2020 Oliver Bldg., Pittsburgh 22.*

▶ *STAINLESS STEELS*—Eight page data sheet details chromium-nickel-manganese stainless steels types 202, 204, 204L. Publication gives information on such items as inter-granular corrosion, mechanical properties, analysis, stress rupture properties. *Allegheny Ludlum Steel Corp., Dept. HPAC, 2020 Oliver Bldg., Pittsburgh 22.*

▶ *STEEL*—Revised edition of 256 page booklet pocket sized steel data book gives information on machining and fabricating, specifications and tolerances, weights and dimensions, elements and safe loads. Tables, definitions, general data also included. *Joseph T. Ryerson & Son, Inc., Dept. HPAC, Box 8000-A, Chicago 80.*

▶ *STEEL TUBE FITTINGS*—Engineering data on "7000" and "8000" series "Ermeto" hydraulic flareless tube fittings, "Flare-Twin" SAE 37 deg flare hydraulic tube fittings incorporated in new 48 page catalog. In addition to engineering specifications, section is devoted to assembly instructions, materials, finishes, operating pressures. *Weatherhead Co., Ft. Wayne Div., Dept. HPAC, 128 W. Washington Blvd., Ft. Wayne, Ind.*

▶ *SWIMMING POOL PUMPS*—New information on recently extended line of five self priming centrifugal pumps developed especially for filtering of swimming pools available on catalog sheets. All five pumps available with close coupled electric drive, 3450 rpm, in sizes 1/3 to 1 1/2 hp with standard jet pump motors. *Barnes Mfg. Co., Dept. HPAC, Mansfield, Ohio.*

▶ *TECHNICAL DATA CATALOG*—Revised catalog lists technical data books available from publisher. Pocket sized reference books cover branches of engineering, are for use by engineers, technical workers, students, teachers, etc. *Lefax Publishers, Dept. HPAC, Philadelphia 7.*

▶ *"TEFLON" EQUIPMENT*—Brochure describes tetrafluoroethylene resin as a material. Discusses its properties such as inertness to chemicals, high dielectric properties, resistance to wide temperature range, low friction characteristics, weather resistance. Company's "Teflon" products include thin and heavy walled tubing and rod, steel pipe lining, insulated wire, machine parts, sheet. *Haveg Industries, Inc., Halocarbon Div., Dept. HPAC, 800 Greenbank Rd., Wilmington 8, Del.*

▶ *TEMPERATURE CONTROL SYSTEM*—Handbook SA 2476 details "Electronic Moduflow" temperature control system designed to regulate indoor comfort according to outdoor weather conditions. Literature recommended by company to installers, service men. *Minneapolis-Honeywell Regulator Co., Dept. HPAC, Minneapolis 8.*

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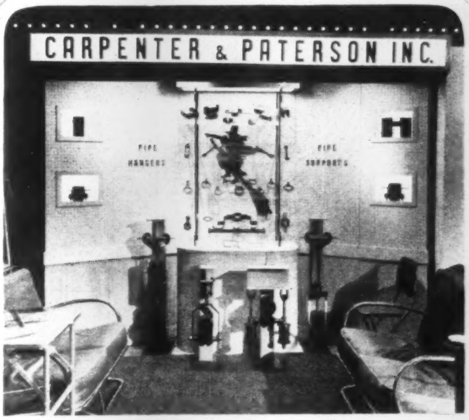

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RECENT TRADE LITERATURE

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▶ *TEMPERATURE CONTROL SYSTEMS*—New 16 page booklet describes application of automatic electric temperature control systems in today's modern schools. Literature written to acquaint school personnel with correct application of proper automatic electric controls to obtain best results from heating, air conditioning systems. *Barber-Colman Co., Dept. HPAC, Rockford, Ill.*

▶ *TEMPERATURE REGULATORS*—Two 2 page bulletins describe temperature regulators in two types. One is needle type single seat valve, spring adjustment. Other is balanced type double seat valve, spring adjustment. Both are self contained, vapor pressure operated units designed for specified temperatures 60 to 240 F. *Atlas Valve Co., Dept. HPAC, 280 South St., Newark* 5.

▶ *THERMAL CONDUCTIVITY ANALYZER*—Construction, operation, features of "Condu-Therm" analyzer and "Acratron" electronic recorder presented in 12 page catalog 56-1008-59. Contains special section on gas sampling systems, how and why this analyzer is used. *Hays Corp., Dept. HPAC, Michigan City, Ind.*

▶ *TIME DELAY RELAYS*—Two bulletins, superseding material in current catalog, contain details on function of three dial adjustable time delay relays, along with catalog part numbers for standard ranges, voltages in a-c, d-c and 400 cycle. Bulletin AWH TD404 describes surface mounting type units; AWH TD405 describes flush mounting type for panel installation. *A. W. Haydon Co., Dept. HPAC, Waterbury, Conn.*

▶ *UNIT HEATERS*—New 64 page bulletin 9417 contains specifications, operating characteristics as well as installation, application data for line of "Venturafin" unit heaters. Vest pocket sized booklet designed as handy source of unit heater information for on-the-job calculations. *American Blower Corp., Dept. HPAC, Detroit* 32.

▶ *VALVES*—Heating valves for commercial, industrial use covered in condensed catalog No. 146. Special emphasis given to company's expanded line of heavy duty globe, gate, check units. Also included is line of radiator and circulator valves and fittings for steam, gravity, forced hot water heating systems. *Hammond Brass Works, Dept. HPAC, Hammond, Ind.*

▶ *VALVES*—*Guide for Selecting Valves, Boiler Mountings, Lubricating Devices* is title of circular No. 555. New sections describe "LQ600" bronze globe valves, "Luncor" polyvinyl chloride all-molded valves, solder end valves. Included are tables, technical data, information on selection. *Lunkenheimer Co., Dept. HPAC, Cincinnati* 14.

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RECENT TRADE LITERATURE

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▶ *VALVES*—Direct operated water pressure reducing valves detailed in form 1009. Literature includes cutaway illustrations, descriptions, capacity tables, list of typical applications. *Spence Engineering Co., Inc., Dept. HPAC, Walden, N.Y.*

▶ *WATER CONDITIONING*—*The "new" water treatment gadgets—do they work?*, is title of 4 page reprint available. Author discusses these "gadgets," tells whether they do or do not work. *E. W. Smith Chemical Co., Dept. HPAC, 15020 E. Proctor Ave., Puente, Calif.*

▶ *WELDING*—"Selec-Tic" welding shop wall chart lists main uses for various of company's welding rods. *Eutectic Welding Alloys Corp., Dept. HPAC, 40-40 172nd St., Flushing 58, N.Y.*

▶ *ZEOLITE SOFTENERS*—New 20 page publication 1520 deals with necessity for water softening, explaining fundamentals of softening and selection of equipment and zeolites. Also describes operation of "Hydromatic" valve for manual or automatic control of cycling of process. *Cochrane Corp., Dept. HPAC, 17th St. below Allegheny Ave., Philadelphia 32.* ⌗

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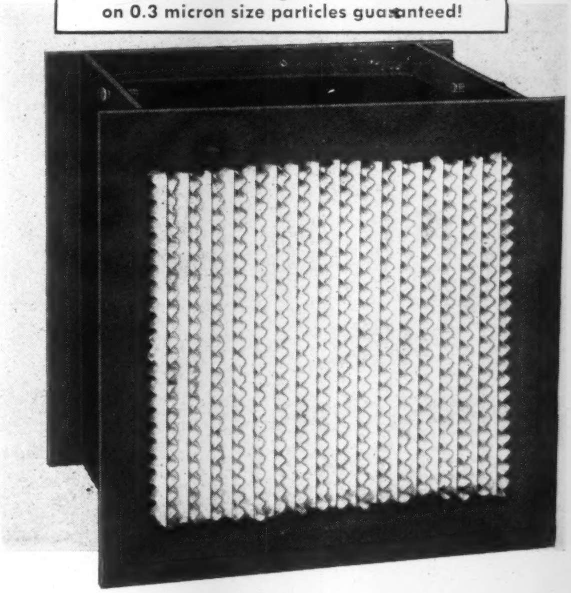

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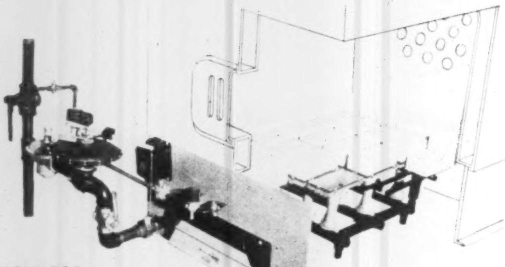

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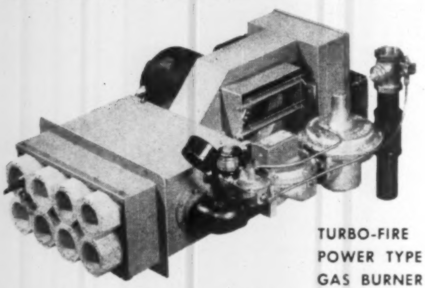

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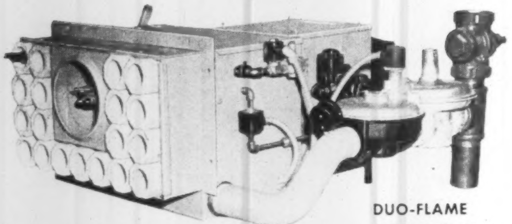
POWER TYPE
GAS BURNER

GORDON & PIATT GAS BURNERS



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Glow Top atmospheric upshot burner fires firebox boilers at maximum efficiency. No expensive combustion chamber required. Standard fire brick completely covers cast ports. Shape and capacity are flexible . . . 45 sizes listed in Catalog GT55-1. Other sizes on application.

Turbo-Fire power type gas burner for applications where forced draft is preferred. Refractory nozzles and distinctive air distribution give desired flame characteristics. Factory assembled with pre-wired control panel. Sizes listed to 18 million BTU/HR in Catalog FG-C10.

Duo-Flame combination gas-oil burner, a new design for applications requiring peak performance for either gas or light fuel oil up to 30 GPH. Factory assembled, independent air adjustment either fuel, retracted oil nozzle on gas firing. Catalog E-30.

GORDON & PIATT also manufacture a complete line of domestic conversion burners plus large dual fuel units. *Write for literature and complete information.*

Gordon & Piatt

P. O. Box 914
Winfield, Kansas

WHO'S WHAT . . .

(New personnel, promotions)

▶ *YORK DIV., BORG-WARNER CORP.*—Stewart E. Lauer, chairman of the board; Henry M. Haase, president and chief executive officer.

▶ *H. K. PORTER CO., INC.*—T. M. Evans, chairman; Charles L. Holbert, executive vice president; Fred C. Foy, a director. Mr. Foy is president of Koppers Co., Inc.

▶ *SERVEL, INC.*—John H. Wall, general manager; Arthur A. Pieper, vice president in charge of finance; Harold J. Luke, treasurer and assistant secretary.

▶ *REFRIGERATION AND AIR CONDITIONING CONTRACTORS ASSOCIATION NATIONAL*—Newly elected officers are: William D. Moody, president; Harvey O. Miller, first vice president; Armand Cowan, second vice president. New directors are: J. P. Stewart, C. L. Walling, Jack Wanless, Al G. Dietl, B. A. Holmsten.

▶ *CARRIER CORP.*—John M. Rachal, a vice president. He will continue as general manager of the firm's international division.

▶ *HAYS CORP.*—Frederick M. Rutledge, manager of project engineering.

▶ *PENN CONTROLS, INC.*—Grover M. Russell, manager of design engineering; Francis X. Fessler, manager of heating and gas appliance controls division; Robert L. Place, assistant to Mr. Fessler; James F. Kinney, manager of pump and air compressor controls division.

▶ *COMBUSTION ENGINEERING, INC.*—Joseph V. Santry, a vice president.

▶ *BRUNDAGE CO.*—C. H. Guptail, process engineering director.

▶ *MUELLER CLIMATROL*—William S. Sutherland, advertising manager.

▶ *KORFUND CO., INC.*—Dr. Bela K. Erdoss, president.

▶ *JOHNSON SERVICE CO.*—John H. Colby, vice president and general sales manager.

WHO'S WHAT

Continued

▶ *BORG-WARNER CORP.*—Roy C. Hauck, manager of Ingersoll Conditioned Air Div.; L. D. Reynolds, plant manager of Primor Products Div.

▶ *MINNEAPOLIS-HONEYWELL REGULATOR CO.*—Ralph L. Goetzenberger, educational consultant to assist in company's activities with colleges, professional societies, technical groups. Mr. Goetzenberger has retired as a vice president. Henry F. Dever, president of Brown Instruments Div., has been given responsibility for directing the parent company's activities in the industrial controls field.

▶ *FASCO INDUSTRIES, INC.*—William F. Purves, director of engineering.

▶ *RAMSET FASTENING SYSTEM, OLIN MATHIESON CHEMICAL CORP.*—John Schwaller, advertising and sales promotion manager.

▶ *CRANE PACKING CO.*—Carl E. Schmitz, executive vice president; Vance E. Vorhees, vice president in charge of sales; B. H. Stenberg, vice president in charge of manufacturing; E. H. Stubenrauch, assistant general sales manager.

▶ *BABCOCK & WILCOX CO.*—S. T. Mackenzie, vice president in charge of sales department of boiler division; Paul H. Carlson, advertising manager for tubular products division.

▶ *GOULDS PUMPS, INC.*—Philip J. Olmstead, chief engineer.

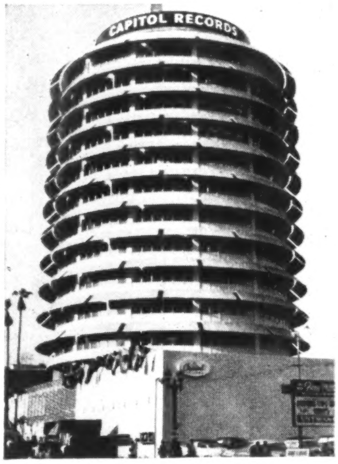
▶ *BELL & GOSSETT CO.*—Joseph Raufeisen, to head up engineering for new refrigeration-compressor division; Frank Gall, manager of heat transfer department; R. E. Anderson, assistant to Mr. Gall.

IN THE TERRITORIES . . .

(Recent sales appointments)

▶ *NOVELTY STEAM BOILER WORKS, INC.*—Mechanical Works Engineering Co., district representative for sales and service in Missouri.

▶ *FAIRBANKS CO.*—Joseph A. Bailey, representative for Louisiana, southern Mississippi and Mobile and Pensacola trading area.



CAPITOL RECORDS BLDG.
LOS ANGELES, CAL.

WELTON, BECKET & ASSOCIATES, ARCHITECTS-ENGINEERS, STATE PLUMBING & HEATING CO., MECHANICAL CONTRACTOR

Capitalize on

MILLER Streamflow CHECK VALVES

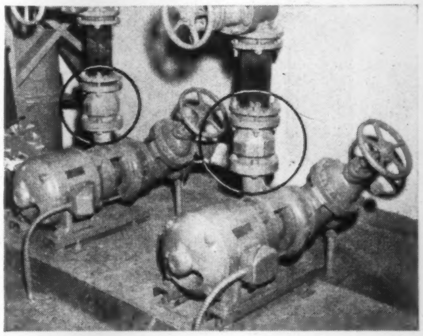
Completely Silences your piping system! CENTER-GUIDED, SHOCK PROOF, NOISELESS, ELIMINATES WATER HAMMER. FULL RADIAL FLOW.

SIZES 1" THROUGH 24".

FLANGED, ASA DRILLING, IBBM, CAST STEEL, ALL ALLOYS. FOR ALL FLUIDS AND GASES.

CERTIFIED MINIMUM PRESSURE DROP CURVE AVAILABLE

Visit our Booth 1118 International Amphitheater, Chicago, Illinois. International Exposition. February 25-March 1, 1957.



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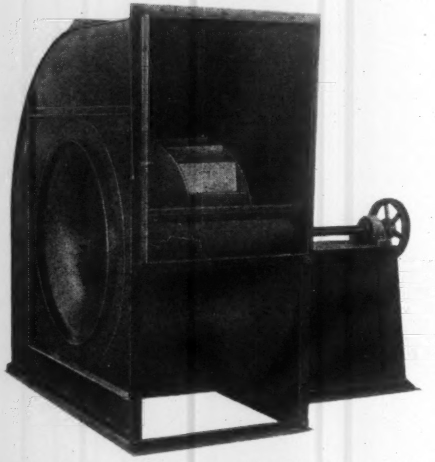
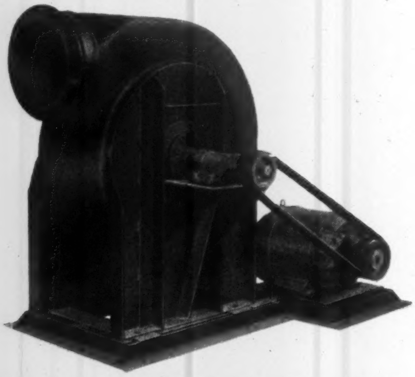
MILLER VALVE CO., INC.

P.O. Box 1255—Pittsburgh 30, Pa. Plant—1620 Pennsylvania Ave.

Champion



TYPE "BC" (Shown Above) — Complete line of backward curve high efficiency fans in sizes 10½" to 60" wheels, all standard arrangements for special arrangements and types of construction to suit the individual job. Furnished with streamline spun cone inlet for low noise and high efficient performance.
TYPE "S" — Forward curve fans delivering high volume at low tip speeds. Quiet and efficient operation. Special construction and arrangements can be furnished on application.
TYPE "C" AND "B" — Cast iron housed fans with either forward curve or radial blade fan wheels. Can be coated and treated for fume hood and acid resistant conditions. Specially adapted for laboratory fume work.
TYPE "M" AND "L" (Shown Below) — Specially designed fans for high acid and caustic fume work. Lined with coating of special Haveg material for this purpose. Very popular in the Chemical Industry.
We specialize in fume hood and acid resisting fans. In addition to the Haveg line fans we can furnish on special order fans made of polyvinyl chloride or polyester fiber glass. We can furnish any kind of special construction or design desired.
Send inquiries to Department M.



CHAMPION BLOWER & FORGE CO.
LANCASTER, PA.
Offices in principal cities.

WHO'S WHAT

Continued

▶ *TUTHILL PUMP CO.*—Paquin Co., representative for northern half of Ohio exclusive of Toledo, and counties west and directly south of Toledo.

▶ *MINNEAPOLIS-HONEYWELL REGULATOR CO.*—N. Stanley Stake, branch commercial sales manager in Philadelphia; Thomas C. Leaver, a similar post in Pittsburgh; Robert L. Jameson, Buffalo commercial sales manager.

▶ *BUENSOD-STACEY, INC.*—Recently appointed representatives are: Air Equipment Distributors of Wisconsin, Milwaukee; Air Handling Products Co., Toledo; Air Products Equipment Co., Chicago; D. S. Anderson Co., St. Louis; E. J. Baker Co., Minneapolis; W. H. Baker Co., San Francisco; Bratton Sales Engineers, Birmingham; Cooling & Heating Engineers, Los Angeles; Crawley-Gorbandt Co., Atlanta; Frey Equipment Co., Dayton; I. M. Golan Co., Ft. Worth; Leonard F. Luchner, Boston; James R. McQuaide, Philadelphia; George E. Mead Co., Seattle; D. C. Murphy Co., Des Moines; Paller Engineering Co., Indianapolis; J. W. Snyder, Cincinnati; Robert E. Mason and Co., Charlotte.

▶ *LEWIN-MATHES CO.*—Roy C. Klostermeyer, assistant director of sales, to work out of St. Louis office and handle tube and rod sales; Ken Adams, district manager of Cincinnati office.

▶ *CARRIER CORP.*—Representatives to handle company's newly expanded line of unit heaters are: Bryce Byard of Harry Wright, Jr. and Assoc., Cincinnati; Richard C. Nye of Harry Wright, Jr. and Assoc., Marietta, Ohio; Mecha-line Co., Oklahoma City; Frontier Engineering Services Co., Salt Lake City; Jim Marshall Engineered Sales Service, San Antonio; R. Dykstra, Grand Rapids; Paul N. Stack Sales Co., Charlotte.

▶ *TRANE CO.*—Richard A. Matheis, manager of Cincinnati sales office; J. J. Mirabile and Glenn Frese, to handle packaged air conditioning lines in Philadelphia and Cleveland offices, respectively.

▶ *HALSTEAD AND MITCHELL*—J. W. Cherry Co., representative for northern Louisiana, eastern Texas, southern Arkansas.

▶ *JOHNSON SERVICE CO.*—Donald G. Cherry, sales engineer in charge of newly established branch office at Harvey, Ill. The new facility brings to 104 the total number of branch offices owned by the company. ╪

WE HEAR THAT . . .

▶ *FLEXONICS CORP.* has acquired the Flex-O-Tube Div. of *MERIDAN CORP.* Flex-O-Tube will continue normal operation as a division of Flexonics. *MEL MAURER*, Flex-O-Tube president, will continue as chief executive officer of the division.

▶ Coinciding with the observance in 1957 with its 25th business year, *DeZURIK SHOWER CO.* is placing into operation several substantial new additions to its plant. At the same time, the company announces a change in its corporate name to *DeZURIK CORP.*

▶ An agreement has been reached whereby *ROBERTSHAW-FULTON CONTROLS CO.* will acquire all of the assets and business of *ACRO MFG. CO.* Under present plans Acro will become a division of Robertshaw-Fulton and its operations will be continued with its present management and staff.

▶ Ground breaking ceremonies for *NATIONAL-U.S. RADIATOR CORP.*'s proposed Research Park Engineering Center are to be held at Johnstown, Pa., this month. The company plans to devote the center to research and development work on space heating and air conditioning in addition to heat exchanger equipment and boiler testing. Completion is expected early in 1958.

▶ In a move to increase product diversification and expand existing product lines, *PENN CONTROLS, INC.* has purchased *CAMPBELL CONTROLS CO.* The Santa Ana, Calif., firm will continue operation as a division of Penn.

▶ The 1956 Worcester Reed Warner Medal of the American Society of Mechanical Engineers has been conferred upon *JAMES KEITH LOUDEN*, a Fellow of ASME, in recognition of the contributions made by his book, *Wage Incentives*, and other publications. Mr. Louden is a member, supervisory board, *YORK DIV., BORG-WARNER CORP.*, and vice president and general manager of the commercial division of York.

▶ *ANEMOSTAT CORP. OF AMERICA* has acquired substantial interest in *WATERLOO REGISTER CO.* The companies will continue to operate individually as before, but will work closely together in research and engineering activities, and in sales and marketing.

▶ The opening of a new engineering laboratory for the development and testing of room air conditioners.

NOW AVAILABLE . . the most complete bulletin on spun-aluminum exhausters!

Penn's new Domex brochure, DMX18, has all the facts about centrifugal roof and wall mounted exhausters, as well as axial flow and relief Domex's. Your FREE COPY is available immediately.

DOMEX ROOF EXHAUSTER

More than 60 certified performance tabulations for both direct and V-belt driven roof exhausters are available throughout the range of sizes, and are published in this new brochure. Reliable ratings backed by PFMA certification.

Certified Ratings PFMA

DOMEX WALL EXHAUSTER

More than 12 certified performance tabulations are listed for this newly restyled fan. Its engineered design makes it completely weatherproof. Includes expanding discharge areas.

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FUEL OIL FILTER
the Ideal Unit
for every job...
LARGE OR SMALL
The Finest Filter to
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★INSTALL
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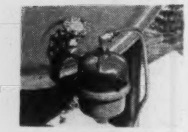
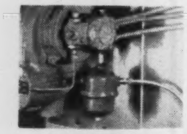
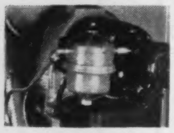
FEDERAL FILTER
MODEL A77
MFG BY NORWOOD PRODUCTS CO
LUVERNE MINN

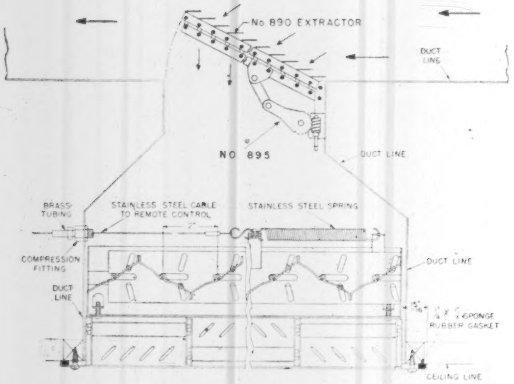

INSTALL ON TANK


PUMP OR BURNER



Here's the *one* filter unit that satisfies both customer and dealer requirements. Designed by heating engineers to prevent clogging of burner nozzles and provide trouble-free service of oil heating systems. Continuous, complete filtration traps all dust, dirt, sludge, rust and other impurities.
One model with 90 g.p.h. capacity handles most filtering jobs. Only one unit to stock—solves inventory problems.
Simple to install with minimum of fittings. Easy to service with replaceable Federal C-77 cartridge which fits all leading filters. Low initial cost makes it easy to sell.
Mention Federal Filter on every call to give your customers trouble-free heat for less money. Contact your distributor or write to: H-1

Norwood Products Co.
(DIVISION OF A. R. WOOD MF'G. CO.)
LUVERNE, MINNESOTA


No 890 EXTRACTOR
DUCT LINE
NO 895
DUCT LINE
BRASS TUBING
STAINLESS STEEL CABLE TO REMOTE CONTROL
STAINLESS STEEL SPRING
2"
COMPRESSION FITTING
DUCT LINE
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15/16"
SPONGE RUBBER GASKET
CEILING LINE

CEILING DIFFUSER with AIR EXTRACTOR, OPPOSED BLADE DAMPER, and attachment for REMOTE CONTROL.

See our exhibit, Booth No. 724, 13th International Heating and Air Conditioning Exposition.

See complete catalog in Sweet's.

Young Regulator Company
5209 Euclid Avenue **Cleveland 3, Ohio**

heat pumps, and commercial and industrial air conditioning units and systems was celebrated recently by *CARRIER CORP.* The facility is the first of three to be built at Syracuse at a cost of about $1 million as part of Carrier expansion plans.

▶ After 12 years at one location in New York City, *CHASE BRASS & COPPER CO.* has moved its office and warehouse business to its own new building in Maspeth, Long Island. The warehouse area is about 60,000 sq ft of floor space while the office space occupies about 13,000 sq ft.

▶ A new compressor production line, designed to increase previous production capacity by over 100 percent, has been put into operation by *TRANE CO.* The operation is part of Trane's $13 million expansion program.

▶ *SURFACE COMBUSTION CORP.* has announced formalized plans for its *WEBSTER ENGINEERING CO.* division's new plant at Tulsa. The Webster plant, which will occupy 43,000 sq ft, is part of Surface's overall building expansion program in Toledo, Columbus and Tulsa.

▶ *MINNEAPOLIS-HONEYWELL REGULATOR CO., ROCKWELL MFG. CO., TRANE CO., CARRIER CORP., RHEEM MFG. CO., AMERICAN AIR FILTER CO., INC.,* and *COLEMAN CO., INC.* are among the recipients of an "Excellent Management" for 1956 rating given by the American Institute of Management.

▶ *JOHN J. NESBITT, INC.* has completed negotiations for a long term lease for a new one-story industrial building in Philadelphia. The structure, which contains 50,000 sq ft of floor space, will be used by Nesbitt for warehousing and as a sales office.

▶ *CRANE PACKING CO.* has completed a $3,300,000 expansion and construction program, including a new home office, laboratory, and factory building at Morton Grove, Ill. New plants also have been built in Los Angeles, Houston and Hackensack, N.J.

▶ *AIR REDUCTION SALES CO.* has acquired the assets and business of *JACKSON PRODUCTS, INC.* Jackson Products manufactures welding electrode holders, welding helmets, safety goggles, and other supplies for the electric arc welding field. #

MEETINGS & CONVENTIONS

FEB. 12-14—*Electrical Trade Conference and Exposition.* Shoreham Hotel, Washington, D.C. Sponsored by Electric Institute of Washington, 10th and E Sts., N.W., Washington 1, D.C.

FEB. 18-21—*Sixth Annual Industrial Ventilation Conference.* Kellogg Center, Michigan State University. Information: Industrial Ventilation Conference, Continuing Education Service, Michigan State University, East Lansing, Mich.

FEB. 25-28—*American Society of Heating and Air-Conditioning Engineers, Inc.*, 63rd annual meeting. Conrad Hilton Hotel, Chicago. Information: A. V. Hutchinson, executive secretary, ASHAE, 62 Worth St., New York 13. (The meeting program appears on page 202 of this issue.)

FEB. 25-*MARCH* 1—*13th International Heating and Air-Conditioning Exposition.* International Amphitheater, Chicago. Under management of International Exposition Co., 180 Lexington Ave., New York.

MARCH 11-15—*National Association of Corrosion Engineers*, annual conference and exhibition. Kiel Auditorium, St. Louis. NACE headquarters: 1061 M&M Bldg., Houston 2.

MARCH 11-15—1957 *Nuclear Congress.* Convention Hall, Philadelphia. Information: Engineers Joint Council, 29 W. 39th St., New York 18.

MARCH 18-21—*Society of the Plastics Industry*, annual national conference and Pacific Coast plastics exposition. Hotel Biltmore and Shrine Exposition Hall, Los Angeles. SPI headquarters: 250 Park Ave., New York 17.

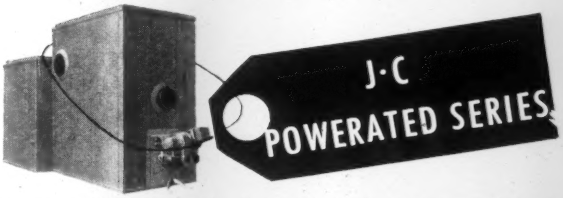
MARCH 27-29—*19th Annual American Power Conference.* Hotel Sherman, Chicago. Information: Illinois Institute of Technology, 35 W. 33rd St., Chicago.

APRIL 2-4—*National Association of Corrosion Engineers*, corrosion control short course. Central Oklahoma section and University of Oklahoma, Norman. NACE headquarters: 1061 M & M Bldg., Houston 2.

APRIL 8-12—*American Welding Society*, national spring meeting. Hotel Sheraton, Philadelphia. To be held in conjunction with the Fifth Welding and Allied Industry Exposition, Convention Hall, Philadelphia. Information: American Welding Society, 33 W. 39th St., New York 18.

JACKSON & CHURCH FURNACES

HANDLE DIFFICULT HEATING JOBS



Jackson & Church engineering has produced a new Powerated furnace line which matches today's heaviest duty requirements. These new furnaces develop static pressures up to 1½" W. C. with lock-seam, leakproof casings designed to carry the heaviest air load over the unit for air conditioning. Oil, gas or dual-fuel firing with outputs from 152,000 to 3,800,000 Btu. The J-C Powerated Series incorporates the latest advances in modern industrial and commercial heating.

J·C GAS·FIRED
SUSPENDED SERIES

Available for heating plants, stores, churches, schools and other large structures, these new gas-fired models have inputs of 200,000 to 400,000 Btu, with some units approved either as horizontal furnaces or as blower type heaters. These J-C units provide the convenience of gas firing plus all the advantages of suspended type heating such as savings in floor space and almost limitless zone heating possibilities. Drawer type burners for easy accessability, easy installation. J-C gas-fired suspended furnaces are built for minimum maintenance.

J·C OIL·FIRED
SUSPENDED SERIES

Space-saving oil-fired suspended models, available in a wide range of sizes with outputs of 89,000 up to 1,000,000 Btu, these easily installed units are most versatile in application. They can be installed singly or in batteries, and can supplement other heating for plant expansion and they are readily adapted to year round air conditioning. These dependable units solve many commercial and industrial heating problems.

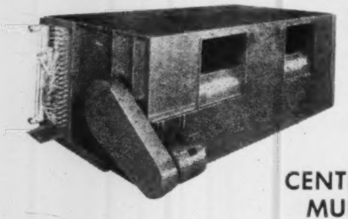
J·C
DIRECT·FIRED SERIES

With outputs from 400,000 to 2,000,000 Btc, and available for oil, gas or dual-firing, J-C Direct-Fired units are ideally adapted for large commercial or industrial heating jobs. They may be installed on the floor, or suspended either inverted or horizontally. They are self contained, automatically controlled units equipped with induced draft fan and air circulating blowers. J-C Direct-Fired Unit design makes savings possible in both installation and maintenance costs.

Visit the J-C exhibit, space 846-850 — 13th International Heating and Air Conditioning Exposition — International Ampitheatre February 25 to March 1, 1957.

J-C
JACKSON & CHURCH — FURNACE DIVISION
Saginaw, Michigan

THERMAL AIR CONDITIONING EQUIPMENT



- ENGINEERED FOR MAXIMUM EFFICIENCY
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CENTRAL PLANT AND MULTIZONE UNITS

- 16 Casing Sizes
- 500 to 21,000 cfm
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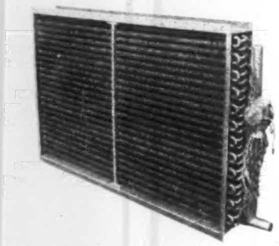
THERMAL COOLING AND HEATING COILS

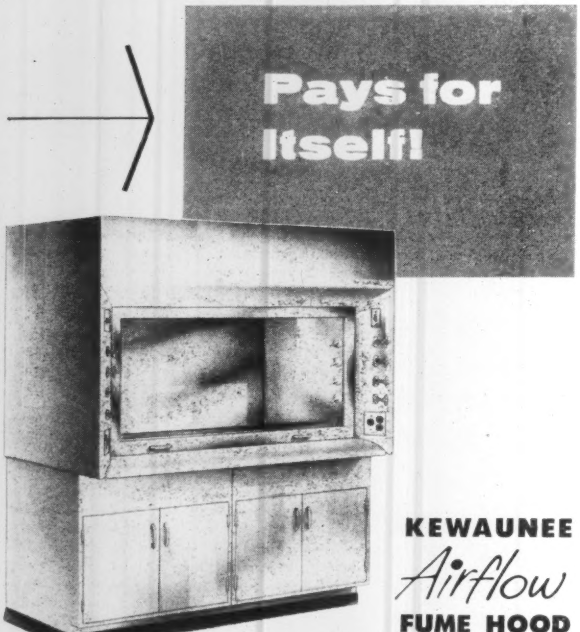
- Non-Freeze Steam
- Direct Expansion
- Standard Steam
- Chilled Water
- Hot Water



1 to 10 Rows — Cooling
1 to 4 Rows — Hot Water
1 and 2 Rows — Steam
Copper Tubes and Aluminum Fins
Copper Tubes — Copper Fins — Solder Coated

MANUFACTURERS REPRESENTATIVES: TERRITORIES AVAILABLE IN CERTAIN AREAS

THERMAL ENGINEERING CORPORATION
2605 W. Dallas Houston, Texas
QUALITY PRODUCTS SINCE 1945



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Airflow
FUME HOOD

Operates Safely at a Face Velocity of 50 fpm

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Kewaunee Mfg. Co.
J. A. Campbell, President
5123 S. Center St. Adrian, Mich.
Representatives in principal cities

MEETINGS & CONVENTIONS

Continued

APRIL 10-12—*National Nuclear Instrumentation Conference* and *Third Southeastern Exhibit*. Atlanta. Information: Herbert Kindler, Instrument Society of America, 313 Sixth Ave., Pittsburgh 22.

APRIL 14-27—*United States World Trade Fair*. Coliseum, New York. Information: United States World Trade Fair, 331 Madison Ave., New York.

APRIL 15-17—*Building Research Institute*, annual meeting. Edgewater Beach Hotel, Chicago. BRI headquarters: 2101 Constitution Ave., Washington 25, D.C.

APRIL 15-17—*Oil-Heat Institute of America, Inc.*, third annual commercial-industrial oil burning and equipment conference. New York University, New York City. OHI headquarters: 500 Fifth Ave., New York.

MAY 1-2—*National Warm Air Heating and Air Conditioning Association*, second annual technical conference. Hotel Cleveland, Cleveland. NWAHACA headquarters: 640 Engineers Bldg., Cleveland 14.

MAY 3-7—*Western Air Conditioning, Heating, Ventilating and Refrigeration Conference and Exhibit*. Shrine Exposition Hall, Los Angeles. Information: Fred J. Tabery, 3443 S. Hill St., Los Angeles.

MAY 6-8—*Air-Conditioning and Refrigeration Institute*, annual meeting. The Homestead, Hot Springs, Va. ARI headquarters: 1346 Connecticut Ave., N. W., Washington 6, D.C.

MAY 7-10—*Mechanical Contractors Association of America*, annual meeting. Hotel Fontainebleau, Miami Beach. The association is at 30 Rockefeller Plaza, New York 20.

MAY 8-11—*Fluid Control Institute, Inc.* The Greenbriar, White Sulphur Springs, W.Va. Information: Fluid Control Institute, Inc., P.O. Box 191, Decatur, Ill.

MAY 14-16—*Industrial Nuclear Technology Conference*. Museum of Science and Industry, Chicago. Information: Dr. Leonard Reiffel, Armour Research Foundation, Illinois Institute of Technology, 10 W. 35th St., Chicago 16.

MAY 20-22—*National Association of Corrosion Engineers*, northeast region corrosion control conference. Syracuse University, Syracuse, N.Y. NACE headquarters: 1061 M & M Bldg., Houston 2.

NOW! ...for combined heating-cooling systems

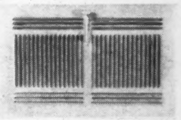
...custom comfort for every room

CEILING AIR DIFFUSERS

Flush or extended models; also dampers and installation rings

NO. 551 PERIMETER WALL REGISTERS

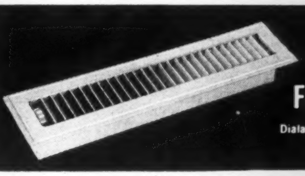
Fractionator volume control; complete 360° air diffusion.



NEW!

B-24 PERIMETER BASEBOARD DIFFUSERS

Adjustamatic finger-tip damper control; built-in damper.



PH SERIES PERIMETER FLOOR REGISTERS

Dialamatic-control; set-screw for easy balancing.

...with this complete line of Standard Stamping Registers!

These four Standard Stamping Registers enable you to select the air pattern best suited to the size, shape, and use of every room served by a combined heating-cooling system. They're easier to install, trouble free, and give every two-way system perfect air distribution without blasts, hot spots or cold corners! Get the facts about them now!

MAIL THE COUPON NOW FOR FREE LITERATURE!

STANDARD Stamping & Perforating Company
3125 W. 49th Place, Chicago 32, Illinois

Gentlemen: Please send me your Registers and Grilles Catalog.

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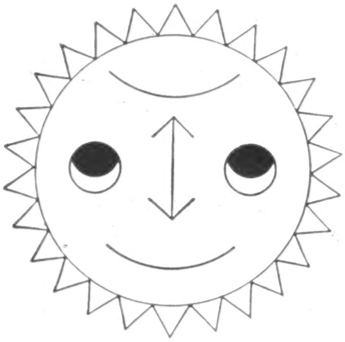
Company ____________________

Address ____________________

City ____________ Zone ______ State ________

The tragic fact, our doctors tell us, is that every third cancer death is a needless death... *twice* as many could be saved.



LET'S LOOK AT THE BRIGHTER SIDE

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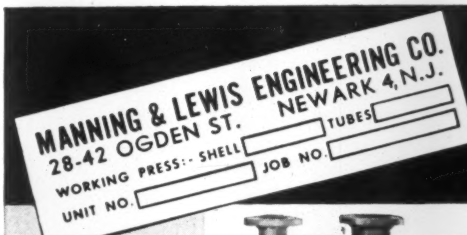

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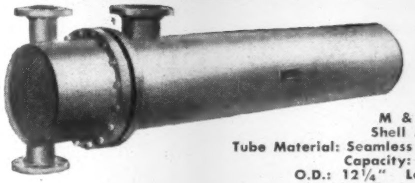

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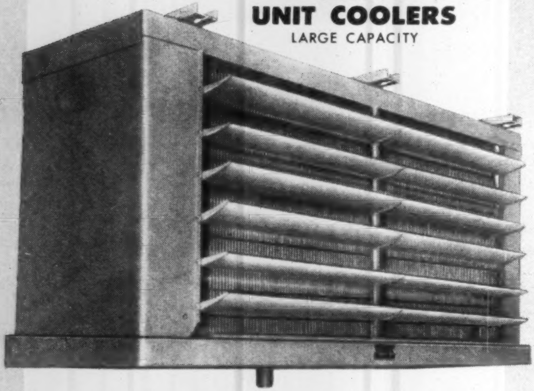

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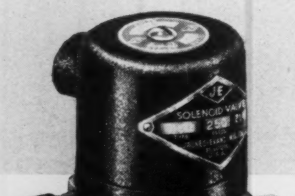

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JUNE 3-6—*National District Heating Association.* 44th annual meeting. The Homestead, Hot Springs, Va. Information: John F. Collins, Jr., secretary-treasurer, NDHA, 827 N. Euclid Ave., Pittsburgh.

JUNE 3-7—*Oil-Heat Institute of America, Inc.*, 35th annual convention. Sheraton-Plaza Hotel, Boston. OHI headquarters: 500 Fifth Ave., New York 36.

JUNE 5-7—*National Warm Air Heating and Air Conditioning Association*, West Coast summer convention. San Francisco. NWAHACA headquarters: 640 Engineers Bldg., Cleveland 14.

JUNE 11-13—*Third Western Plant Maintenance and Engineering Show.* Civic Auditorium, San Francisco. Management: Clapp & Poliak, Inc., 341 Madison Ave., New York 17.

JUNE 24-27—*American Society of Heating and Air-Conditioning Engineers, Inc.*, semi-annual meeting. Murray Bay, Quebec. Information: A. V. Hutchinson, executive secretary, ASHAE, 62 Worth St., New York 13.

SEPT. 9-13—*12th Annual Instrument Automation Conference and Exhibit.* Cleveland Auditorium, Cleveland. Sponsored by Instrument Society of America, 313 Sixth Ave., Pittsburgh 22. Exhibit information: Fred J. Tabery, 3443 S. Hill St., Los Angeles.

NOV. 14-16—*American Society of Refrigerating Engineers*, semi-annual meeting. Morrison Hotel, Chicago. ASRE headquarters: 234 Fifth Ave., New York.

NOV. 18-21—*10th Exposition of the Air-Conditioning and Refrigeration Industry.* International Amphitheater, Chicago. Air-Conditioning and Refrigeration Institute, 1346 Connecticut Ave., N. W., Washington 6, D.C.

NOV. 18-22—*National Warm Air Heating and Air Conditioning Association*, committee meetings and annual convention. Morrison Hotel, Chicago. NWAHACA headquarters: 640 Engineers Bldg., Cleveland 14. ⌗

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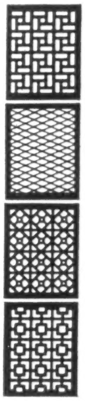

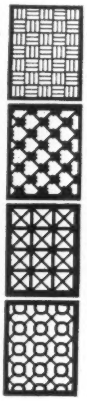

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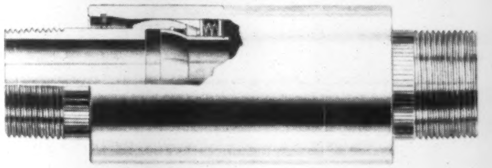

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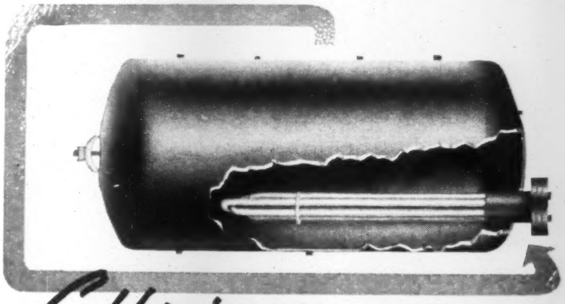

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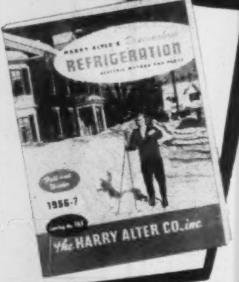

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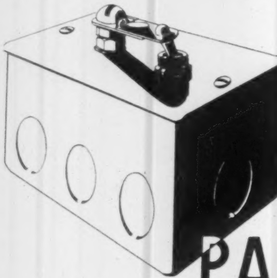

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Proceedings of the Fifth Annual Water Symposium—Bulletin No. 55, Engineering Experiment Station, Louisiana State University, Baton Rouge, La. $1.75 (no stamps).

Handbook of Welded Steel Tubing—Revised Ed. Formed Steel Tube Institute, 850-52 Hanna Bldg., Cleveland 15. $10.00.

Fundamentals of Vibration Analysis—By Nils O. Myklestad. 260 pp. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. $6.50.

Wood Maintenance For Water-Cooling Towers—7 pp. Bulletin WMS-104, Cooling Tower Institute, 446 Emerson St., Palo Alto, Calif. $1.50.

Mechanical Vibrations—Fourth Ed. By J. P. Den Hartog. 436 pp. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. $9.00. ‡

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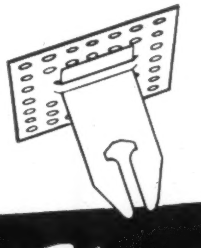

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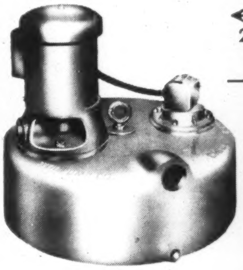

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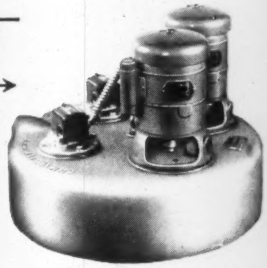

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TVC-19	750	20	.38	1.5	¼	2	1	21″ -10 Gal.	6⅞″
TVC-23	1000	20	.5	1.5	¼	2	1	21″ -10 Gal.	6⅞″
TVC-29	2000	20	1.0	3.0	¼	2	1	21″ -10 Gal.	6⅞″
TVC-35	4000	20	2.0	6.0	¼	2	1	21″ -10 Gal.	6⅞″
TVC-41	6000	20	3.0	9.0	⅓	2	1	21″ -10 Gal.	6⅞″
TVC-47	8000	20	4.0	12.0	½	2	1	25½″-15 Gal.	7³⁄₁₆″
TVC-52	10000	20	5.0	15.0	¾	2	1	25½″-15 Gal.	7³⁄₁₆″
TVC-54	15000	10	7.5	22.5	½	3	1¼	25½″-26 Gal.	10½″
TVC-55	15000	20	7.5	22.5	¾	3	1¼	25½″-26 Gal.	10½″
TVC-56	15000	30	7.5	22.5	1	3	1¼	25½″-26 Gal.	10½″
TVC-57	15000	40	7.5	22.5	1½	3	1¼	25½″-26 Gal.	10½″

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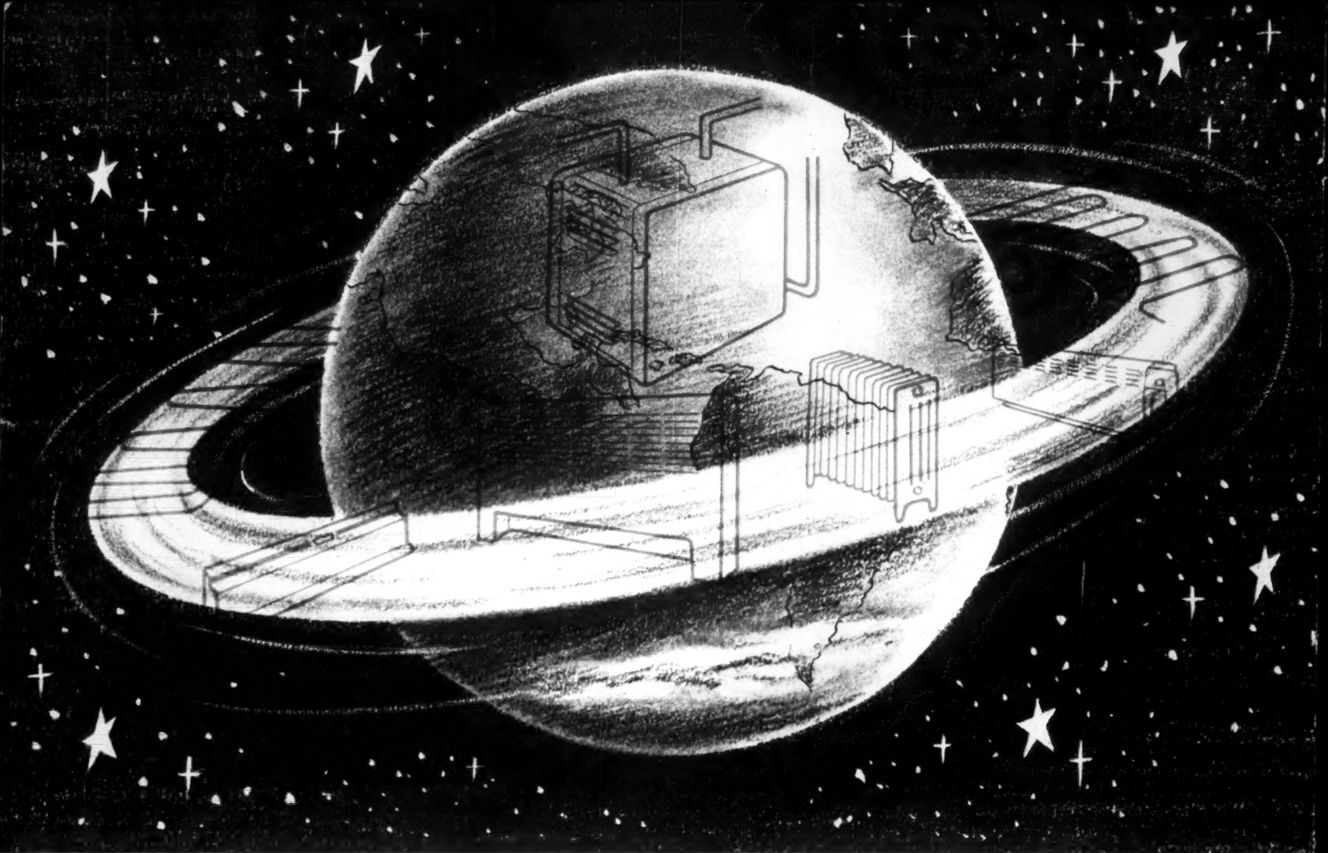

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